Queensland

AGRICULTURAL JOURNAL

COMMONWEALTH INSTITUTE OF ENTOMOLOGY LIBRARY
23 MAY 1958
Aus. 12

MINISTER AT REDLANDS EXPERIMENT STATION (SEE PAGE 144).

Vol. 84. MARCH, 1958 No. 3

Contents

« »

Page.

Pastures—

Seasons Hold No Worry for Beaudesert Dairyman. By W. J. White 127

Dairying—

Low Milk Yield from Hungry Cows. By S. E. Pegg 133

Report on Group Recording. By S. E. Pegg 135

Crops—

Fodder Crops and Oat Trials at Kairi. By J. T. van der List 141

Horticulture—

Avoid Fertilizer Burn in Strawberries. By J. B. Davey 145

When Are Cauliflowers Ready for Harvesting? By R. L. Prest 149

Pest Control—

Fruit Fly Problem in Southern and Central Queensland. By A. W. S. May .. 153

Control of Potato Pests in South Queensland. By A. W. S. May 161

Cattle Breeding—

Santa Gertrudis-Hereford Cross Gave More Weight. By J. J. Sullivan and L. A. Willis 167

Sheep and Wool—

A Letter from Ballyrandoo 174

Fauna—

Queensland Fauna Sanctuaries. By C. Roff 175

Fertilizers—

List of Fertilizers Registered under "The Agricultural Standards Act of 1952." By Registration Officers of the Standards Branch 179

Miscellaneous—

Careers for Country Boys and Girls. By E. T. Hockings 186

Editor: E. T. Hockings.

Subscription Rates: Queensland farmers, schools and students—5s. per annum; others—£1 per annum.

Seasons Hold No Worry For Beaudesert Dairyman

By W. J. WHITE, Adviser in Agriculture.

"Feed your cows during winter and drought if you are to maintain good, even milk production," says a Beaudesert dairy farmer, who is supplying wholemilk through the Beaudesert factory to the Brisbane market.

This farmer has made a careful and successful study of farm management, fodder conservation methods and feeding.

Here is his story:

The farm is divided into two blocks. The home portion of 410 acres on which the dairying and farming are conducted is mainly alluvial fertile gum flats. An additional area of 600 acres of forest ridges is used for growing young heifers and carrying dry stock as replacements for the dairy herd.

The total number of stock carried on the two blocks is 230, with 25 heifers reared each year.

In June, 1950, he commenced supplying wholemilk to the Brisbane market. In that month, 85 cows produced 911 gallons of milk and 342 lb. of butter, a total of 1,670 gallons of wholemilk. The area under cultivation was 85 acres planted to lucerne and green grazing crops. The cows were not stall-fed but were allowed to graze on green crops and paspalum and clover pastures and fed some lucerne hay if required.

The farmer then set a target for 200 gallons of wholemilk daily throughout all months of the year. He planned as follows:

(1) To increase the number of cows and to cover all channels leading to the production of more milk by better and more economical feeding methods.

Plate 1.

This Hayshed with Multiple Doors Enables Easy Filling and Emptying, yet Protects the Hay from Sun and Rain.

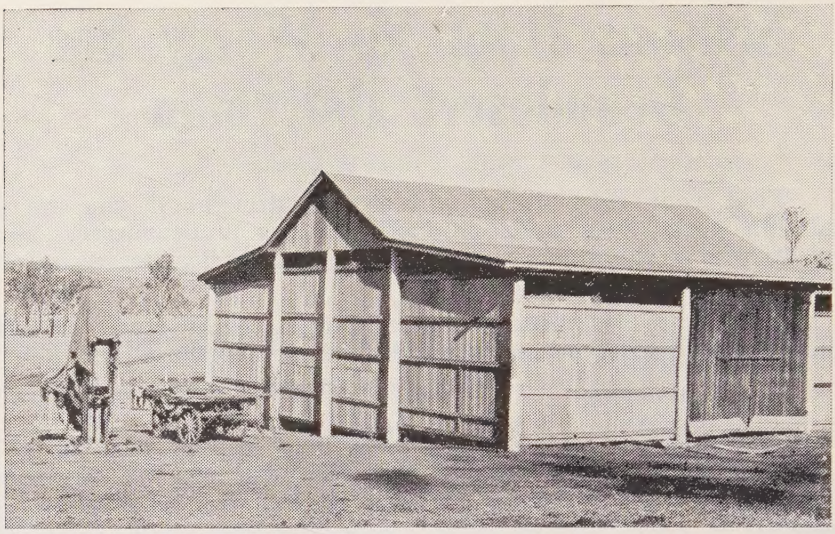


Plate 2.

Another Large Hayshed that Protects the Hay to the Greatest Extent, and has Effective Top Ventilation.

(2) To grow all fodder crops on the property; improve the existing pastures; and purchase extra concentrates only when conditions made it necessary.

(3) To increase the cultivation area from 85 to 100 acres and to map out a complete cropping programme to provide rotational green grazing crops, and sufficient hay and grain for winter months, and drought.

(4) To build feeding stalls and extra storage sheds and to acquire machinery to grind meal and to harvest crops.

Plate 3.

A Stack of Roll Bales in a Hayshed. These are readily opened up for chaffing.

In May, 1957, the farmer achieved his objective. In that month 104 cows produced 5,894 gallons of milk and 154 lb. butterfat, which is equal to 6,334 gallons of wholemilk.

One hundred and four cows are now producing over 200 gallons of milk daily.

MANAGING THE PASTURE.

The dairy block carries mainly paspalum and white clover. This provides good green grazing during the spring and summer months, but the pasture during winter is only fair, depending mainly on weather conditions.

Rank growth of paspalum during January and February is controlled by mowing with a Woods rotary cutter. This removes ergot-infested seed heads, and improves the quality and palatability of the pasture.

LUCERNE THE MAIN CROP.

Lucerne is the main crop grown. A stand of 50 acres is maintained to provide grazing when other crops are short, and hay for storage. A Roto-baler is used for baling. This type of bale is found to be very good, particularly when chaffing or feeding through the hammer-mill.

Twenty-five acres are planted to hybrid maize each year for grain. This is harvested by a single row picker, fed through the hammer-mill in the cob and used as meal.

Another 25 are planted during summer months to cowpea, white panicum and Japanese millet. This is grazed, using an electric fence to control the stock.

During winter months, with suitable rains, all available land is planted to grazing crops of oats, barley, tares and field peas.

WATER HAS TO BE PUMPED.

With very little surface water on the property, water for stock is provided from three bores and one well. This is pumped into storage tanks capable of holding 24,000 gallons, by windmills and a pump jack with electric motor.

Cement water troughs are conveniently arranged to eliminate unnecessary travelling by stock.

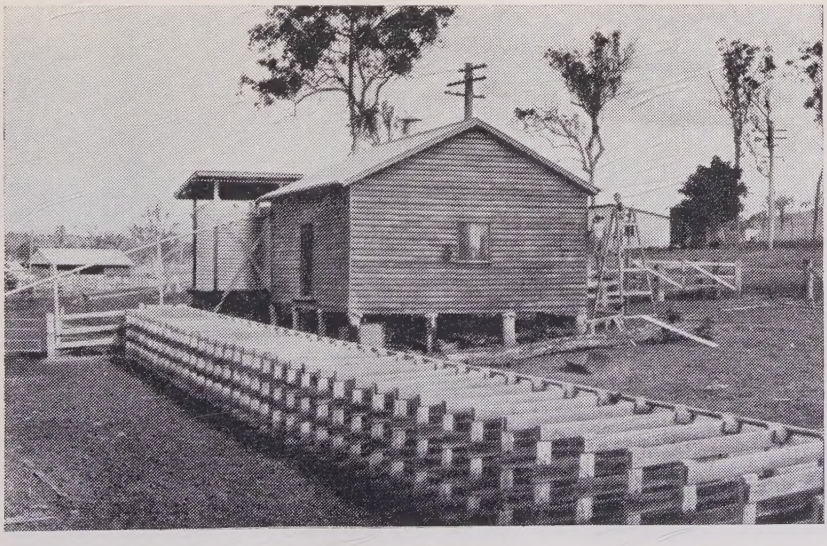


Plate 4.

Feeding Stalls Arranged So That Feed Truck Filled From Grain Tank and Hayshed Can Be Run Easily Along Rails in Front of the Stalls.

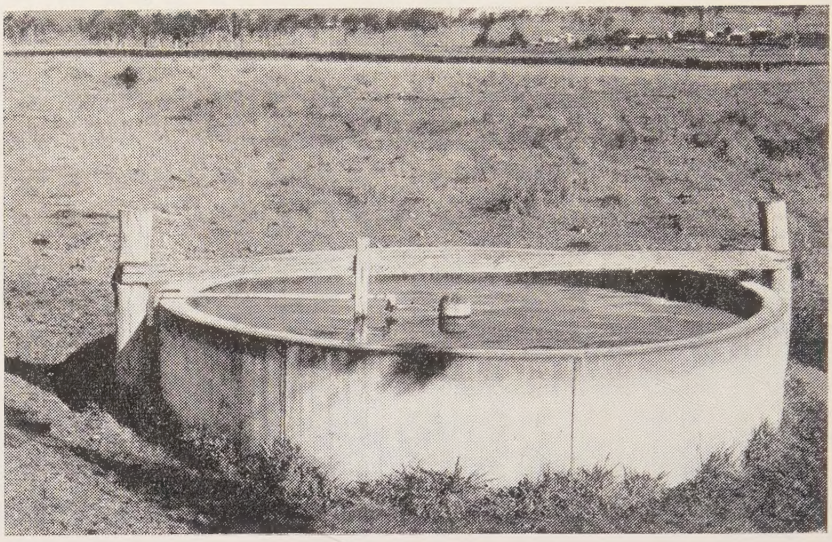


Plate 5.

A Sound and Capacious Water Trough Sufficient to Ensure an Adequate Supply of Cool Water to the Stock.

46 FEED STALLS.

Feeding commences before production drops. If grazing is poor in the autumn, the cows are stall-fed until good rains occur to provide sufficient grazing.

The cows are fed once a day in stalls after the morning milking. If they are to graze lucerne, they are put in immediately after they come out of the stalls; it is claimed that this will assist in controlling bloat.

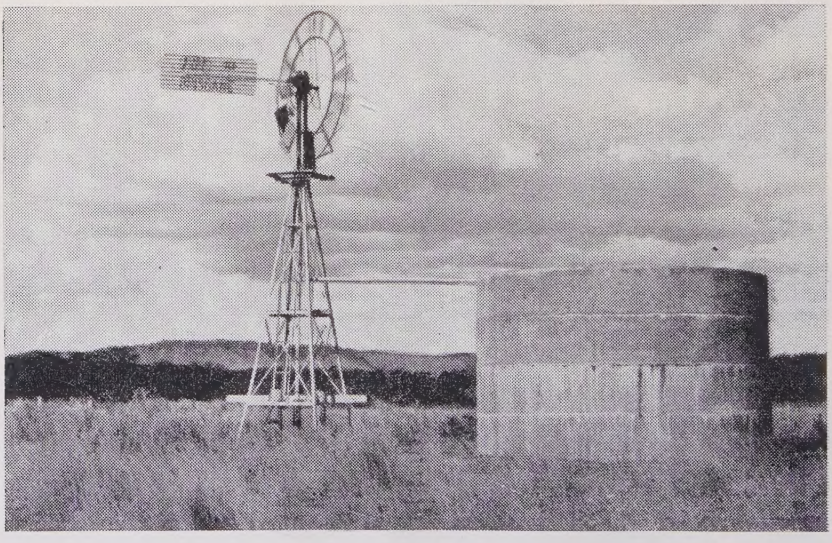


Plate 6.

Windmill and 10,000 gal. Cast Concrete Tank Supply Sufficient Water Storage to Carry Over Long Windless Periods.

Feeding the cows is carried out in 46 well-constructed feed stalls.

Above the cows' heads, and running the full length of the stalls, is a galvanised iron pipe that prevents the cows from throwing up their heads and wasting feed.

All grain is put through the hammer-mill and blown into a storage tank. This is situated above trolley lines in front of the stalls. The trolley has two compartments, one for concentrates, and the other for chaff which is tipped into the trolley from the floor of the barn.

Grain sorghum is purchased sometimes to increase grain meals. This year, it was bought reasonably well at £22 per ton in larger lots. Meatmeal was purchased at £45 a ton.

COWS GET THIS RATION.

The ration fed in the stalls is 4 lb. lucerne chaff to each cow, plus 5 lb. to 8 lb. of a 16 per cent. protein concentrate mixture, according to production. Heifers and stale cows are fed 5 lb. concentrates, while fresh cows get 8 lb.

Concentrates are mixed on the property. They comprise 3 lb. crushed grain sorghum, 3 lb. crushed maize (cob and husk) and 1 lb. meatmeal.

COST OF THE FEED.

The cost of this feed is based on lucerne at £1 a bag, grain sorghum £22 a ton and meatmeal £45 a ton. At these rates the feed each cow receives in the stalls costs 2s. 6d. The cows are averaging two gallons each, which at 3s. a gallon is 6s. from each cow daily.

Taken over the whole herd, stall-feeding costs amount to £14 daily in dry periods and the milk return is £30.

CALVES AND PIGS WELL FED.

Calf rearing is considered most important. After four to five days on the cows, the calves are fed for five days on wholemilk.

The wholemilk is gradually changed over to buttermilk powder and the same concentrate mixture as is fed to cows. The buttermilk powder and the concentrates are mixed and fed as a gruel.

Plate 7.

Creeper Growing Over a Rough Timber Frame Provides Shade on an Almost Treeless Flat.

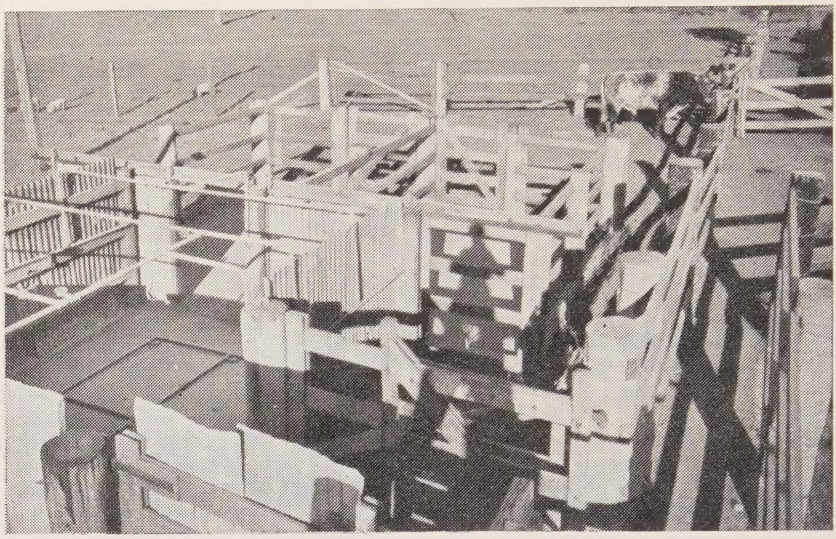


Plate 8.

A Spray Yard and Draining Pen Constructed Beside the Main Loading Race Permit Convenient Handling for Tick Control.

Calves are later changed to a dry meal mixture, consisting of 1 lb. lucerne chaff, ½ lb. buttermilk powder and 1 lb. concentrates.

At three months or just over, they are usually taken off feed and allowed to graze on pastures. If necessary, some dry lucerne hay is fed.

Pigs are a profitable side-line on the property despite the fact that it is essentially a wholemilk farm.

If milk becomes available through a surplus or being put off from the factory in summer in periods of oversupply, it is used for pigs.

When no milk is available, the pigs are fed on lucerne put through the hammer-mill, mixed with buttermilk powder and meatmeal.

Twelve Large White brood sows are carried on the farm, and farrowings are arranged to take advantage of surplus skim-milk. All litters are taken to baconer weights.

RENEW YOUR JOURNAL SUBSCRIPTION EARLY.

Journal subscribers are requested to renew their Journal subscriptions well in advance of the month of expiry, as it is often difficult to provide missing numbers.

Low Milk Yield From Hungry Cows

By S. E. PEGG, Chief Adviser, Herd Recording Section, Division of Dairying.

A look at the average production of dairy cows in Queensland (as shown in "Report on Group Herd Recording", page 135 of this issue) makes one wonder why it is so low. It is very hard to believe that our dairy cows are such poor producers as the figures indicate.

At the present price of 3s. 4d. a lb. commercial butter, the cow which produces 150 lb. butterfat returns £30 10s. a lactation. As the average herd in Queensland is about 40 milking cows, the yearly return from the butter factory would be £1,220. To this must be added the return from pigs and any cash crops. After deducting all running expenses it must be agreed that the owner of an average herd has little to show for his work.

But how about all the owners of herds that are below average?

Can it be that breeding is at fault? Forty years ago, the need to use pure-bred sires was stressed. Since then there has been continuous emphasis on breeding for production. At present we find that a fair percentage of our cows are by carefully selected pure-bred sires. A survey conducted in 1956 showed that pure-bred bulls were used in 80 per cent. of the herds being recorded.

From this evidence it does appear that we are breeding cows that can produce much better than present figures indicate.

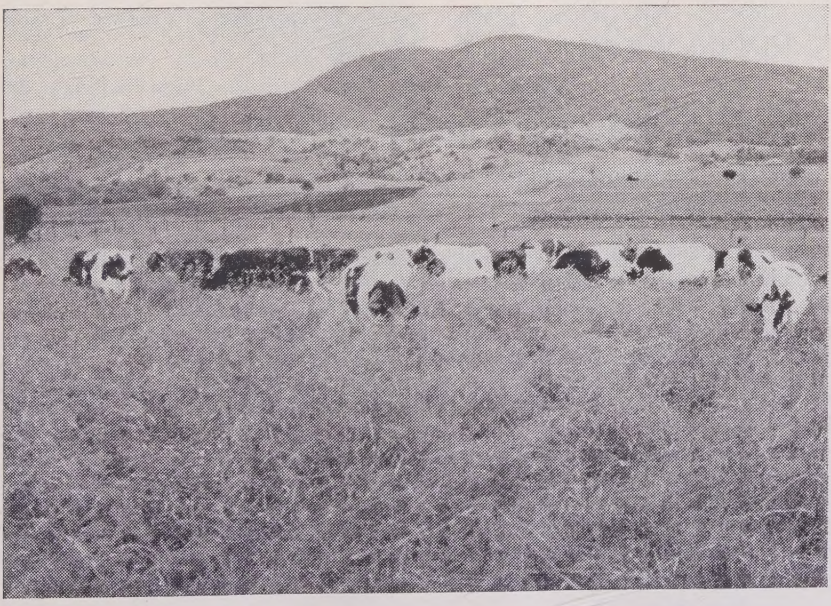


Plate 1.

Good Pasture Boosts Production.

POOR FEED IS TO BLAME.

Well, what is wrong? It doesn't matter how well a cow is bred, she cannot produce any better than she is fed. Much of the blame, then, for our low average production must be attributed to poor feeding.

Take a look at an average herd. These cows are producing around 150 lb. butterfat each lactation. Not much, is it? On examination we find that for a big part of the year their ribs are showing, and they are hungry. These cows are not getting enough feed!

What does a cow want in the way of food? Firstly, intake of food must be sufficient in energy-making substances. A cow requires energy to seek food. Most of our pastures supply this, but they reach a stage where, owing to these pastures being unpalatable, the cows will not eat enough to satisfy their requirements.

NOT ENOUGH PROTEIN.

Secondly, a cow's intake of food must be sufficient in protein. Perhaps the main cause of low production in Queensland is a low protein intake. Dairying relies on pasture for the bulk of food. Unfortunately, many of our pastures are low in protein because of the lack of a suitable legume. The incorporation of legumes in the pastures is difficult owing to the low and uncertain winter rainfall. Irrigated pastures and improved rain-grown pastures are doing much to overcome this shortage. Until some cheap source of protein is readily available our average production will remain at a low level.

Thirdly, a cow's intake of food must be sufficient in essential minerals. Most of the coastal areas of this State are deficient in some of the essential minerals. Chief amongst these are phosphorous and calcium. These elements can be supplied in the form of licks.

Topdressing of pastures with superphosphate can also be undertaken to overcome phosphorous deficiency in the pastures. At present, work is being undertaken in coastal dairying areas to examine the economics of this method of pasture improvement.

Until sufficient quantities of the right sort of feed are available cows cannot be expected to produce to their capacity.

Butterfat Content of Cream

Inquiries are often received from producers as to why cream tests suddenly vary. When this occurs the accuracy of butterfat testing is often questioned.

Answer: The first step in understanding these variations is to realise that in the operation of separation, liquids of varying density are separated under the action of centrifugal force. The more dense skim-milk portion moves to the outside while the lower density butterfat is thus forced toward the centre of the separator bowl. In addition in the cream separator there is a relatively uniform relationship between the volume of cream and the volume of skim-milk (about 1:10).

The reason for sudden variation may be one of the following:

(*a*) Change in the fat content of the bulk milk due to fresh cows coming into the milking herd. This is the most important factor causing variations.

(*b*) Uneven flow of milk to the separator due to a faulty float or a loose tap.

(*c*) Excessive flushing of cream from the spout with skim-milk at the finish of separation.

(*d*) Uneven speed of separation as a result of a slipping belt.

Report On Group Herd Recording

By S. E. PEGG, Chief Adviser, Herd Recording Section, Division of Dairying.

During the year, 59,711 cows from 1,466 herds completed recorded lactations. The average production of these completed lactations was 350 gallons of milk and 149 lb. butterfat. This was 6 lb. of butterfat less than the previous year. In view of the drought conditions prevailing the results were better than anticipated.

The 1956-57 herd recording year (ended 30th September, 1957) was one of the worst experienced by dairymen in Queensland. In 1956 heavy rain and floods prevailed until April. This was followed by a dry winter and spring, with spasmodic rainfall late in the year. During the first quarter of 1957 the rainfall was less than half the normal amount. This was followed by a dry autumn which prevented the planting of winter cereals. Some relief rains were experienced in July but the remainder of the year was dry.

Early in the recording year a number of new groups was formed. Owing to the adverse seasonal conditions some of the existing groups were amalgamated. In all, during the year, 81 groups were operating—an increase of two over the previous year.

The total number of completed lactations and average production for each year since Group Recording was commenced are given in Table 1.

Average Production of Age Groups.

Table 2 shows the number of cows, according to age groups, which completed lactation periods of 300 days or less, and the average production of milk and butterfat for a lactation period.

Unknown Ages.

A regrettable feature of Table 2 is the large number of cows of unknown ages—11,441 out of 59,711 (19.2 per cent.). In the previous year the number was 8,024, or 14.8 per cent.

In herds that have been recorded for a number of years this necessary information should be available.

TABLE 1.

NUMBER OF COMPLETED LACTATIONS AND AVERAGE PRODUCTION PER COW.

Year.	Number of Herds.	Number of Lactations.	Average Production per Cow.		
			Milk (lb.).	Test (%).	Butterfat (lb.).
1948–49 ..	507	17,216	3,289	4·3	144
1949–50 ..	715	22,392	3,523	4·3	152
1950–51 ..	814	26,798	3,312	4·4	146
1951–52* ..	818	23,123	2,657	4·2	112
1952–53 ..	1,073	34,304	3,467	4·3	150
1953–54 ..	1,202	41,378	3,143	4·3	134
1954–55 ..	1,266	45,734	3,486	4·3	150
1955–56 ..	1,412	54,352	3,563	4·3	155
1956–57* ..	1,466	59,711	3,508	4·2	149

* Drought year.

TABLE 2.

AVERAGE PRODUCTION IN AGE GROUPS OF COWS WHICH COMPLETED LACTATION PERIODS OF 300 DAYS OR LESS DURING THE 1956–57 HERD RECORDING YEAR.

Age Group.	Number of Cows.	Average Production per Lactation.		
		Milk (lb.).	Test (%).	Butterfat (lb.).
2-year-old	8,964	3,049	4·3	132
3-year-old	7,098	3,259	4·4	142
4-year-old	5,589	3,486	4·3	151
Mature	26,619	3,796	4·2	159
Unknown Age	11,441	3,364	4·2	141
Total	59,711	3,508	4·2	149

Average Length of Lactation.

The average length of lactation was 230 days. This is the longest average period recorded in this State, and exceeded last year's average by one day.

The average length of lactation each year since 1948-49 is given in Table 3.

TABLE 3.

AVERAGE LENGTH OF COMPLETED LACTATIONS.

Year.	Days.
1948–49	220
1949–50	223
1950–51	203
1951–52	209
1952–53	210
1953–54	211
1954–55	224
1955–56	229
1956–57	230

The average length of lactation for each of the areas of the State is shown in Table 4.

TABLE 4.

AVERAGE LENGTH OF LACTATION ACCORDING TO DISTRICT.

District.	Length of Lactation (Days).
Atherton Tableland ..	248
Mackay	242
South-Eastern Queensland	235
Eastern Downs	233
Western Downs	231
Central Burnett	227
Dawson-Callide	227
South Burnett	225
Port Curtis	222
Upper Burnett	222

The short length of lactation of dairy cows in Queensland is a serious problem. A later article will deal with the loss in production sustained as a result of short lactation periods.

Average Production in Each Group.

Table 5 shows the average production for each of the Herd Recording Groups. The groups are listed according to districts and the average production for each district is shown in the same table.

Butterfat Ranges of Cows.

The number of cows in the various butterfat ranges is shown in Table 6.

TABLE 6.

NUMBER OF COWS IN VARIOUS PRODUCTION RANGES OF BUTTERFAT.

Range of Butterfat.	Number of Cows.	Per-centage.
Under 100 lb. ..	13,449	22·5
100–149 lb.	19,390	32·5
150–199 lb.	15,318	25·7
200–249 lb.	7,288	12·2
250–299 lb.	2,782	4·7
300–349 lb.	1,005	1·7
350–399 lb.	343	·6
400–449 lb.	98	·2
450–499 lb.	20	·03
500 lb. and over ..	18	·03

The percentage of cows producing less than 100 lb. butterfat increased from 20.2 last year to 22.5 this year. This latter figure is the same as for the 1954-55 year. It is much too high, as it means that two cows out of

TABLE 5.

GROUP AND DISTRICT STATISTICS FOR 1956–57.

District/Group.	Herds.	Cows.	Average Length of Lactation.	Average Milk.	Average Test.	Average Butterfat. 1956-57.	Average Butterfat. 1955-56.
			Days.	Lb.	%	Lb.	Lb.
Atherton Tableland ..	*88*	*3,212*	*248*	*4,180*	*4·1*	*173*	*170*
Malanda No. 1 ..	18	760	256	5,175	4·0	205	200
Malanda No. 2 ..	25	858	244	3,864	3·9	152	161
Malanda No. 3 ..	22	739	239	3,888	4·2	164	159
Millaa Millaa ..	23	855	251	3,869	4·5	175	172
Mackay	*24*	*988*	*242*	*3,024*	*4·5*	*135*	*120*
Mackay No. 1 ..	13	557	251	3,248	4·5	146	133
Mackay No. 2 ..	11	431	231	2,734	4·4	121	107
Port Curtis	*91*	*3,272*	*222*	*2,648*	*4·7*	*123*	*131*
Mount Larcom No. 1	18	693	224	2,677	4·6	124	120
Mount Larcom No. 2	18	624	222	2,254	4·6	105	116
Rockhampton ..	22	858	227	2,826	4·6	131	169
Rosedale	15	557	221	2,738	4·9	134	147
Wallaville	18	540	211	2,697	4·5	121	122
Dawson-Callide	*59*	*3,084*	*227*	*2,990*	*4·4*	*132*	*140*
Biloela No. 1	18	1,038	236	3,205	4·5	143	145
Biloela No. 2	13	837	231	3,015	4·5	136	139
Biloela No. 3	14	563	206	2,576	4·3	110	..
Wowan	14	646	228	2,969	4·3	129	134
Upper Burnett	*56*	*2,620*	*222*	*3,286*	*4·3*	*142*	*149*
Monto No. 1	19	943	209	3,516	4·2	149	160
Monto No. 2	20	1,042	227	3,175	4·2	134	144
Monto No. 3	17	635	234	3,137	4·6	144	143
Central Burnett	*70*	*3,552*	*227*	*3,248*	*4·3*	*139*	*137*
Biggenden	20	823	239	3,496	4·4	155	169
Mundubbera No. 1 ..	16	892	218	2,812	4·1	115	141
Mundubbera No. 2 ..	19	858	235	3,595	4·3	154	121
Mundubbera No. 3 ..	15	979	219	3,137	4·3	136	124
South Burnett	*244*	*9,992*	*225*	*3,609*	*4·1*	*149*	*159*
Durong	17	1,117	235	4,477	3·9	177	156
Kilkivan	15	456	239	2,769	4·1	114	131
Kingaroy	22	882	221	4,249	3·8	162	180
Kumbia-Ironpot ..	15	722	196	3,392	3·9	131	..
Murgon	20	986	233	3,362	4·2	142	147
Nanango No. 1 ..	20	805	238	3,645	4·1	148	146
Nanango No. 2 ..	19	769	234	4,077	4·1	166	169
Nanango No. 3 ..	19	644	208	3,418	4·1	140	..
Proston No. 1 ..	19	754	224	3,496	4·6	162	162
Proston No. 2 ..	20	895	216	2,842	4·4	124	..
Tansey	18	752	222	3,035	4·4	134	145
Wondai	21	728	241	3,978	4·0	160	180
Wooroolin-Tingoora ..	19	484	204	3,442	4·2	143	..
South-East Queensland ..	*552*	*22,238*	*235*	*3,251*	*4·3*	*140*	*147*
Beaudesert No. 1 ..	18	975	234	3,910	3·8	150	150
Beaudesert No. 2 ..	18	701	218	2,908	4·6	133	158
Beechmont-Currumbin	21	906	240	2,924	4·2	124	130
Beenleigh	21	941	230	3,214	3·8	123	126
Boonah	21	762	243	4,395	4·1	178	190
Brisbane No. 1 ..	25	767	238	4,406	4·1	179	170
Brisbane No. 2 ..	19	759	240	3,367	3·9	131	124
Cedar Pocket	17	698	219	2,717	4·7	127	163
Cooroy	16	688	242	3,173	4·7	148	120

TABLE 5—*continued.*

District/Group.	Herds.	Cows.	Average Length of Lactation.	Average Milk.	Average Test.	Average Butterfat. 1956–57.	Average Butterfat. 1955–56.
			Days.	Lb.	%	Lb.	Lb.
South-East Queensland—continued							
Esk No. 1	18	1,055	235	3,425	4·3	147	154
Esk No. 3	16	648	240	3,349	4·2	142	134
Gatton	16	532	226	3,825	3·9	151	160
Gympie No. 1 ..	18	907	218	2,840	4·4	124	146
Gympie No. 2 ..	15	846	236	2,851	4·9	139	142
Ipswich No. 1 ..	16	497	239	3,299	4·2	139	161
Ipswich No. 2 ..	23	678	219	3,389	4·2	141	158
Ipswich No. 3 ..	15	427	220	3,324	3·9	129	..
Kenilworth	22	850	251	3,597	4·5	162	166
Kilcoy	19	1,049	222	2,680	4·4	119	127
Laidley	12	244	219	3,041	4·7	142	146
Lowood	19	493	247	3,544	4·3	152	157
Landsborough-Caboclture	14	698	231	2,920	4·3	126	137
Maleny No. 1	21	707	247	3,133	4·6	143	145
Maleny No. 2	23	944	259	3,482	4·5	158	171
Mapleton-Kureelpa ..	19	647	264	3,095	4·4	137	137
Maryborough	16	659	228	2,987	4·5	136	134
Merrimac-Mudgeeraba	17	885	246	3,410	4·1	140	155
Miva-Theebine ..	16	772	234	2,774	4·5	126	145
Mount Tamborine ..	10	84	225	2,963	4·1	122	146
Pomona	16	810	231	2,981	4·5	134	133
Wolvi	15	609	222	2,591	4·6	118	119
East Downs	*189*	*6,487*	*233*	*4,536*	*4·2*	*189*	*207*
Allora No. 1	21	679	234	4,619	4·2	194	201
Crow's Nest	21	992	225	3,475	4·2	145	162
Goombungee	19	648	245	4,704	4·5	215	220
Oakey	19	916	232	4,337	4·2	181	197
Pittsworth No. 1 ..	21	634	243	5,418	4·1	225	249
Pittsworth No. 2 ..	8	184	237	5,128	4·5	231	217
Toowoomba No. 1 ..	26	563	237	5,167	4·4	225	229
Toowoomba No. 2 ..	21	818	228	4,478	3·9	173	..
Warwick No. 1 ..	20	707	227	4,634	3·9	181	181
Warwick No. 2 ..	13	346	228	4,608	4·1	189	214
Western Downs	*93*	*4,266*	*227*	*4,040*	*4·1*	*166*	*179*
Chinchilla No. 1 ..	21	722	229	3,950	4·3	166	183
Chinchilla No. 2 ..	16	705	226	4,218	4·3	180	200
Dalby	22	859	233	4,501	4·2	187	172
Jandowae	17	1,188	227	3,784	4·1	155	187
Miles	17	792	219	3,831	3·9	149	157
QUEENSLAND AVERAGES	1,466	59,711	231	3,508	4·2	149	155

every nine are producing less than 100 lb. butterfat. Judicious culling and improved feeding would do much to improve the position.

The number of cows producing over 400 lb. butterfat was 136, representing 0.26 per cent. This is lower than last year, when the number was 169 (0.28 per cent.). The drop must be attributed to the adverse seasonal conditions, although this year 18 cows produced more than 500 lb. compared with 11 previously.

Herds in Various Production Ranges.

The numbers of herds in the various butterfat production ranges are given in Table 7.

TABLE 8.

HIGHEST PRODUCING HERDS.

Herd Owner.	Group.	Breed.	No. of Cows.	Average Production.			
				Milk (lb.).	Test (%).	Butterfat (lb.).	Length of Lactation (Days).
11–20 Cows.							
H. M. Waite	Laidley	Jersey	17	7,010	5·1	358	298
Hickey & Sons	Brisbane No. 1	Friesian	15	8,161	4·0	324	296
H. Taylor	Gatton	A.I.S.	17	7,757	4·1	319	289
21 50 Cows.							
V. J. Stenzel	Toowoomba No. 1	Mixed	22	8,260	4·3	359	286
K. M. and R. Laws	Malanda No. 1	A.I.S.	32	8,953	3·9	353	296
H. F. Abel	Goombungee	Jersey	21	6,821	5·1	351	270
51–100 Cows.							
J. McInnes	Durong	A.I.S.	65	8,478	3·7	315	276
A. E. Cox	Goombungee	Jersey	51	5,141	5·3	272	287
W. D. Davis	Chinchilla No. 1	A.I.S.	65	6,940	3·9	272	279
101 and over.							
G. and P. I. Rosenblatt	Biloela No. 2	Jersey	109	4,181	4·7	196	277
P. E. Paulsen	Mundubbera No. 2	Jersey	103	4,022	4·9	196	224
P. E. H. O'Brien	Jandowae	Jersey	151	4,041	4·8	192	262

TABLE 7.

NUMBER AND PERCENTAGE OF HERDS IN VARIOUS PRODUCTION RANGES.

Butterfat Production Range.	Number of Herds.	Percentage of Herds.
Under 100 lb. ..	232	15·8
100–149 lb.	602	41·1
150–199 lb.	406	27·7
200–249 lb.	168	11·5
250–299 lb.	40	2·7
Over 300 lb.	18	1·2

The percentage of herds which averaged under 100 lb. butterfat increased from 12.8 to 15.8 per cent. However, the number and percentage of herds which produced 300 lb. or more increased from 15 to 18.

Highest Producing Herds.

The highest producing herds are shown in Table 8. They are listed according to the number of cows which completed lactations.

The results obtained by these herds must afford great satisfaction to their owners.

Recent surveys carried out in America show that to make dairying profitable it is necessary to have herds which produce well above the average. This is what these owners have achieved. It is not luck, but hard work, allied with intelligent use of herd recording information, which has made these results possible.

Electric Fence Shows Its Value

Pasture Protection Through Strip Grazing is a Normal Part of Good Farming.

Fodder Crops And Oat Trials At Kairi

By J. T. VAN DER LIST, Experimentalist.

When Kairi Regional Experiment Station was established in 1947 one of its first tasks was to devise farming systems that incorporated agricultural crops and pastures. This work was given a place of urgency because it was evident on the maize-growing Atherton Tableland that rotation with pasture would have to be practised if soil structure and soil fertility were to be maintained.

Similarly it was clear that livestock have to be included in this pasture-crop rotation in order to make the pasture side of the programme both workable and profit-making.

Dairy cattle and pigs are the most useful under present conditions, and the former present the biggest problem regarding fodder supply.

Any rotation of maize cropping and pastures will have two unproductive phases namely:—

(1) The period between ploughing of the pastures and planting of the maize crop, and

(2) The time needed to establish the pasture, following the maize crop.

Plate 1.

Typical Growth of Co.301 Fodder Cane at Kairi Regional Experiment Station.

Plate 2.

Establishment of Oat Trials at Kairi Regional Experiment Station.

The losses resulting from this yearly quota of unprofitable land may be acute because they partly coincide with the dry period of the year, July-December, when lack of moisture, and possibly frost damage, drastically reduce pasture growth.

This will result in a decrease of the carrying capacity of the farm for this period of the year, which is very undesirable when we are dealing with dairy cattle.

To overcome this disadvantage of fodder shortage during the dry period a crop of maize is grown for silage, and is followed by oats for grazing, so that with these additional fodders a constant carrying capacity can be maintained throughout the year.

The growing of these fodders can be carried out separately from the main rotation scheme or incorporated within the scheme, and become a yearly feature of the rotation.

If a farm could not be equipped to handle maize silage, a crop of cowpeas could be grown instead in the summer, to be followed by oats for winter grazing. The cowpeas could be grazed or used as green manure, while any surplus of oats could be conserved as hay.

There are other suitable fodder crops such as cowcane, of which two excellent varieties for this district are available, namely Co.301 and Q50; also field peas, mangolds, wheat and barley. However, oats is still the most important grazing crop because of its high yielding potential and nutritional value. We will be concerned about this particular grazing crop in this article.

10 YEARS OF TRIALS.

During the last 10 years, experiments have been carried out at the Kairi Regional Experiment Station with the purpose of determining the most suitable variety and planting time for grazing oats.

It soon became apparent that the best time for planting the oats occurs shortly after the wet season, that is in March or April, as soon as land

preparation can be carried out. By planting at this time the crop is able to take maximum advantage of the stored moisture and greater production is achieved than in the case of later plantings.

Over a number of years, early plantings have out-yielded late plantings, and although pastures might still provide fodder at the time the grazings of the oat crop become available, the nutritional value of the former will be on the decline, so that even a short grazing of oats becomes profitable.

It has also been found that the late plantings carried out in May and June against the early ones in March and April do not extend the grazing much further into the season, and these plantings in general have to rely more on rainfall for their growth.

The oat varieties best suited for grazing purposes are changing as time goes on.

Some varieties, like Vicland, Garry and Fultex, yielded very well up to 1954, when they became susceptible to crown rust, a living fungus inside the plant, which produces spores called rust on the leaves. (Under a magnifying glass or microscope, these spores resemble a crown—hence the name crown rust).

Bovah, which became the best yielding variety, has lost its resistance to some degree in the last two years, but is still a good grazing oat if early planting is practised.

The varieties mentioned all belong to the early- or mid-season types.

Of the late-maturing types, Klein is the best representative, not making the quick, early, erect growth of the others but stooling more profusely and producing a grassy leaf.

This variety has also lost some of its resistance to crown rust.

The overall effect of crown rust on the oats depends on the weather conditions during the season. During wet and mild winters, the disease spreads more rapidly and causes more damage than during dry winters.

CROP AND GRAZING MANAGEMENT.

Seedbed preparation.

The aim should be to prepare a good seedbed as soon as possible following the wet season—usually during March. Following suitable planting rain of at least 50–100 points to moisten the top soil to the depth of the moisture stored in the subsoil, the oats are drilled in at the rate of 40–45 lb. an acre. (When broadcast, larger quantities are needed.)

With the early plantings, some weed control might have to be carried out to eradicate late germinating wild gooseberry (wild hops) and winter weeds. These weeds are easily killed by the 2,4–D hormone weedicides when applied at the rate of ½ lb. acid equivalent per acre. The weedicides should not be applied until the oat seedlings are at least 6 in. to 7 in. tall.

The first grazing may be carried out 6 to 8 weeks after planting when the initial tillering has finished and plants are well anchored in the soil.

An area of a size that can be suitably grazed by the herd in one grazing period should be fenced off with an electric fence. If the area is too large, excessive trampling will occur, while on the other hand, if the area is too small, overgrazing can occur and many plants will be pulled out.

After the area is well grazed down it is spelled until enough re-growth is made to give another grazing. The interval between grazing depends upon seasonal conditions and characteristics of the oat variety grown.

In a good season and under careful management, six to eight grazings can be obtained and the most efficient control is obtained by using an electric fence unit which can be easily moved and re-erected.

ONE ACRE FOR TWO COWS.

The area to be planted to oats each year depends, of course, on the size of the herd, and on the Kairi Regional Experiment Station good results are obtained by allowing one acre of oats to every two cows.

To obtain continuous grazing during the season good results can be obtained

with the following planting programme:—

(1) One-third of the area proposed to be used for grazing oats to be planted after the wet season with an early-maturing variety.

(2) One-third of the area planted with the same early variety, but one month later.

(3) One-third of the area planted with a later maturing variety at the same time as the second planting.

By practising this programme, rotational grazing of the oats can be carried out, and the crop should not get out of hand.

In the following table data from several of the experiments have been shown to indicate the higher yields of grazing oats obtained at Kairi by planting in the March-April period.

GREEN WEIGHT OF OATS GRAZED BY DAIRY HERDS—IN TONS PER ACRE.

Date of Planting.	1954.				1955.				1956.			
	Mar. 31.	Apr. 29.	May 27.	June 22.	Mar. †	Apr. 26.	May 13.	June 17.	Mar. 20.	Apr. 25.	May 22.	June 11.
Variety												
Vicland ..	2·7*	4·4	3·0	1·0	..	5·6	4·9	1·1	..	..	..	..
Bovah ..	..	8·8	5·1	3·3	..	8·5	6·3	1·9	4·7	2·9	1·7	0·2
Klein ..	..	8·8	..	..	..	7·0	4·2	1·6	4·3	2·7	1·0	0·3

* Poor germination.

† The prolonged wet season did not permit plantings to be made in March, 1955.

A Group of Farmers Listening to Speeches at the Presentation of the New Glasshouse at Redlands Experiment Station. The presentation was made by Major P. J. Savage on behalf of the Vegetable Sectional Group Committee and the Other Fruit Sectional Group Committee of the C.O.D. The front cover picture shows the Minister for Agriculture and Stock (Hon. O. O. Madsen, M.L.A.) standing before the microphone. Sitting on his left are: Dr. W. A. T. Summerville (Assistant Under Secretary—Technical) and Mr. W. G. Wells (Director, Division of Plant Industry), Department of Agriculture and Stock; Major P. J. Savage (Chairman, C.O.D. Executive), and Mr. C. Woff (Chairman, Vegetable Sectional Group Committee, C.O.D.).

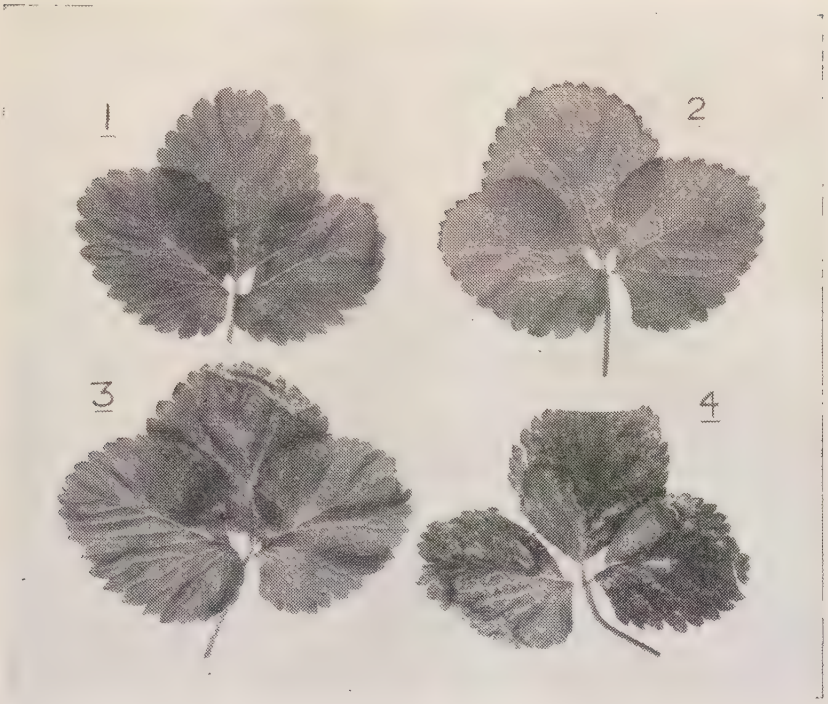


Plate 1.

Strawberry Leaves Showing Symptoms of Fertilizer Burn. (1) Healthy leaf. (2) to (4) Symptom development from marginal scorch to collapse of leaves.

Avoid Fertilizer Burn In Strawberries

By J. B. DAVEY, Experimentalist.

How would you know if you had fertilizer burn in your strawberries? How does it happen? What would you do to avoid it? Strawberry growers will find answers to these questions in the following article:

Over the past few years, the strawberry industry in Queensland has become more stable mainly because of the improved market for fruit of canning quality. This is seen in the expansion of plantings from 180 acres in 1955 to 500 acres in 1957.

A large number of new growers have been attracted to the industry. Naturally enough, some of these were not well versed in production methods. A common fault has been the use of excessive quantities of side-dressing fertilizers. Though applied primarily to improve plant growth and increase yields, such heavy applications sometimes result in serious injury to the plants. In addition, the practice involves waste of fertilizer.

HOW TO RECOGNISE IT.

The most obvious sign of "fertilizer burn," as it is generally known, is marginal leaf scorch. This scorch

appears first on the edges of the oldest, or outside, leaves of the plants as a narrow purple or brown discoloration. In mild cases, the discoloration does not extend farther. However, where more severe injury occurs, the young growth shows a similar scorch which may affect eventually the whole of the leaf tissue.

WHAT CAUSES IT.

Fertilizers in common use for side-dressing strawberries in Queensland are all water-soluble. The 5:13:5 mixture is more or less standard and contains approximately 5 per cent. nitrogen as sulphate of ammonia, 13 per cent. phosphoric acid as super-

Plate 2.

Side Dressing the Strawberry Crop. In the usual double row planting the bulk of the fertilizer is placed between the rows and the balance at the edges. These plants are grown over a "plastic" mulch.

In its worst form, fertilizer burn produces wilting, defoliation, and finally death of the affected plant.

The leaf symptoms of fertilizer burn are an after-effect of injury to the roots of the plants caused by too much fertilizer in the soil.

Dead patches may also appear on strawberry leaves which come into direct contact with soluble side-dressing fertilizers for any length of time. Usually, however, this type of injury is of only minor importance, at least in irrigated crops which are watered regularly during the growing period.

phosphate and 5 per cent. potash as muriate of potash.

Plants get most of the water they need from the soil. The water is taken up from the soil through the root hairs into the root system and then moves from cell to cell within the tissues. It contains nutrients in solution which are essential for normal plant growth.

Normally, the salt concentration of the water in the soil is less than that of the sap in the intake cells of the root hairs. The water therefore moves from the soil into the roots. However,

if the salt concentration of the soil water becomes higher than that of the cell sap in the root tissues, sap movement is reversed and water diffuses out of the roots. This is what happens when too heavy side-dressings of soluble fertilizer are applied to the crop.

Faulty distribution of the side-dressing fertilizer and incorrect irrigation both accentuate the risk of injury when excessive amounts of fertilizer are applied to the strawberry crop. Quite often, the side-dressing fertilizer is dropped in one or more small heaps alongside the plant. This practice is bad because the salt concentration of the soil solution below the heaps is raised to a very high level, the roots are damaged and growth is adversely affected.

The correct procedure is to distribute the fertilizer evenly around the plant.

Heavy watering after the application of a side-dressing fertilizer is desirable. Sufficient water should be used to penetrate the soil to a depth of at least 9 inches. A lighter watering tends to produce an accumulation of soluble salts in a narrow band just below the surface of the soil. This, in itself, may damage the roots, slow down the rate of plant growth, and even injure the leaves.

EFFECT ON GROWTH AND PRODUCTIVITY.

When marginal leaf scorch is confined to the older leaves, the setback to the plants is only temporary.

Plate 3.

Irrigating Strawberries. Thorough soaking of the ground after applying the side dressing fertilizer reduces the risk of fertilizer burn.

Nevertheless, the damage to roots and foliage can be expected to reduce flower numbers, fruit size and consequently, crop yields.

Early recovery of the plants presumes the discontinuance of the heavy fertilizer schedule, and heavy irrigation designed to distribute the concentrated salt solution more widely through the soil. This may involve leaching some of the salts right out of the root zone and a consequent wastage of fertilizer.

All too frequently, heavy side-dressings are applied to strawberry crops in an endeavour to remedy poor plant growth due, not to lack of nutrients in the soil, but other causes such as late planting and red spider injury. This practice can be dangerous in areas where supplies of water for irrigation are limited and the grower is unable to wet the soil to the full depth of the root zone and get the best growth response.

WHAT TO DO ABOUT IT.

1. To obtain high yields of good quality fruit in the strawberry crop, a quick-acting soluble fertilizer with a 5:13:5 or similar formula should be applied in side-dressings, commencing at early flowering.

The rate of application should not exceed 2⅓ lb. of the mixture for each chain of double row planting. Applications may be made monthly. Quantities in excess of this amount are liable to injure the plants and are wasteful of fertilizer.

2. In order that side-dressings can be used by the plants to the best advantage, correct placement and uniform distribution of the fertilizer is essential.

With single row planting, fertilizer is applied either by placing it in a ring around each plant or, alternatively, in a 3-4 inch band on either side of the plant row.

In the case of double row spacings, the fertilizer should cover as much as possible of the area between the two plant rows as well as along each side of the bed.

These methods ensure that the maximum number of roots have access to the fertilizer as it penetrates in solution into the soil.

The fertilizer should be distributed uniformly and great care taken to prevent it coming into direct contact with the leaves.

3. As soon as practicable after the application of the side-dressing, the strawberry crop should be irrigated to a depth of at least 9 in.

During the life of the crop, soil moisture should, of course, be kept at a level sufficient to maintain steady growth of the plants. The frequency of application and the quantity of water applied will vary according to soil type and season. As a general rule, however, irrigation to a depth of 9 in. once a week during the cooler months, and twice a week during the warmer months, will be adequate in crops grown on a reasonably well drained soil.

QUEENSLAND BUSH BOOK CLUB.

The Queensland Bush Book Club will supply reading to anyone living beyond the reach of a town library.

For a fee of 3s. 6d. a year, subscribers may receive parcels of 10 books and some magazines and illustrated papers. Parcels will be carried free to the nearest railway station; members must make their own arrangements for delivery from the station. Each parcel contains about three months' reading but exchanges may be made more often if required.

Write to the Secretary, Bush Book Club, Victory Chambers, Adelaide Street, Brisbane, enclosing 3s. 6d. and you will be enrolled as a member.

When Are Cauliflowers Ready For Harvesting?

By R. L. PREST, Senior Adviser in Horticulture.

Under suitable conditions, most of the cauliflower varieties grown in southern coastal Queensland produce good quality flowers provided the crop is handled efficiently.

Nevertheless, although there are many cauliflower growers, only a few cut and harvest the crop efficiently. By long association with the industry and by close attention to plant selection and cultural practices, such men have earned for themselves a reputation for quality produce. Growers of this calibre invariably obtain the premium paid by the market for choice flowers, a premium often reaching 10s. to 15s. per dozen.

Their reputation has been achieved by careful seed selection and close attention to blanching, cutting at the right time and presentation on the market.

Seed Selection.

Most of the specialist cauliflower growers have, for a period of years, saved seed from selected plants in their own crops. Each season, selected plants producing good size curds that are uniformly white in colour, fine in texture and compact are allowed to go to seed. Selection on these lines has given rise to strains which are well adapted to local conditions, even in plant type and consistent croppers.

Varieties that have contributed towards some of the improved local

Plate 1.

Irrigated Cauliflowers at Rochedale. Plantings are made at regular intervals from February onwards to maintain production during the season.

strains are *Phenomenal Four Months* for second early and main crop plantings and *Model White* for the early plantings.

Blanching.

The hallmark of quality, for which the market pays a premium, is not so much fineness of texture or compactness in the head, though these are important, as whiteness of the curd.

In order to ensure the white head characteristic, it is necessary to exclude sunlight from the flowers. The blemishes caused by exposure to sun, rain, soil particles, insects, diseases, sprays and cold winds all tend to produce an objectionable dull brown or yellowish coloured head. Such heads are not only unattractive in appearance but generally possess an off-flavour.

When the head is in the early button stage, it is protected by small inner leaves but, as the head grows, these leaves lift and covering is then needed.

Method of Blanching.

The method of blanching usually practised by growers is to break the midribs of the larger leaves and bend them over the head with the tips turned down. The inner leaves are broken first and the outer ones last.

The curds develop rapidly, and very quickly reach a stage at which covering is necessary. Covering must begin as soon as the leaves which closely cover the head begin to lift and before the young curd is exposed to sunlight.

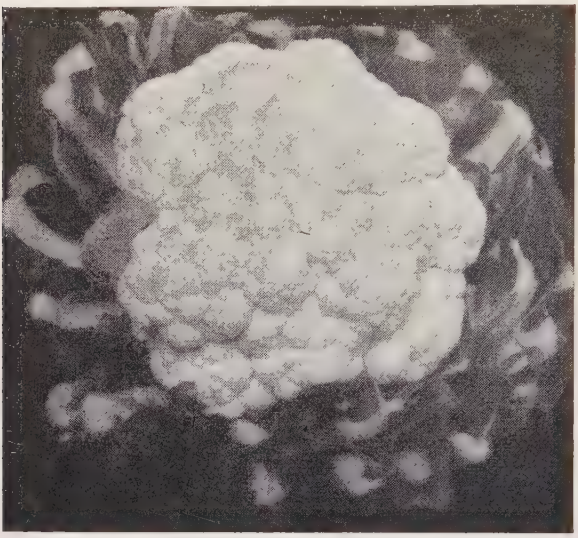


Plate 2.

Good Quality "Flower". Quality commands a premium on the market. A uniform white colour is particularly important but the curd must also be fine-textured and compact.

The leaves used to cover the curd must not shrivel and dry out. If the midrib is partially broken (not severed), the leaves remain fresh for a reasonably long time and provide good protection. Follow-up inspections are necessary, however, to make sure that the covering leaves are not displaced by wind.

This method is a good one provided the work is well done. The results may be unsatisfactory, however, if the covering leaves are broken carelessly or torn from the plant before they are placed in position over the head; they dry out and expose the curds to the sun or, if the weather is wet, rot and discolour the underlying curd.

The period required for blanching the flower varies with seasonal conditions. Early in the season, when growth is rapid, blanching may be completed in 4 to 5 days. However, during the late autumn and winter months, the blanching period may range up to 10 days.

Early varieties, particularly those with upright leaves, are sometimes blanched by drawing the outer leaves over the curd "tent fashion" and tying them above the flower head. String, raffia, rubber bands and similar materials may be used as ties.

Tying should, of course, commence when the young covering leaves begin to lift and before the young curd is exposed. If tying is done too early, it may restrict the development of the head; on the other hand, if tying is left too late, it may not be effective.

In carrying out the tying operation, the leaves should be drawn fairly tightly together but with a small opening at the top which is large enough for the grower to inspect the heads; a large hole may allow curd-spotting by the sun.

Again, frequent inspections are necessary. If different types of material or different coloured twines are used on successive inspections, the grower can readily distinguish between heads in the various stages of development.

Harvesting.

When harvesting cauliflowers, care must be taken to cut the head immediately the curd reaches prime condition, that is, before it becomes ricey, discoloured or "spread."

The plants in any cauliflower crop seldom develop uniformly and a number of cuttings are therefore necessary. When there is any doubt about the maturity of the flowers, it is better to cut early than late. The markets pay a premium for compact white heads of 4 to 6 lb. in weight but it is more important to cut at the right stage of maturity than to cut according to weight or size.

When the heads are left too long in the field, the flower stalks elongate and loose, leafy, ricey or fuzzy curds result. Such over-mature heads wilt rapidly after cutting. In addition, the leaves tend to spread and further

Plate 3.

Leafy Curd in Cauliflowers. This defect may become apparent in the field if the flowers are not harvested at the right stage.

expose the blemished flower. It is best to discard any over-mature heads; they only spoil the appearance of a consignment and have an adverse effect on sales.

When harvesting, the heads are cut below the bottom leaf with a sharp butcher's or cane knife. The large leaves are then trimmed away until only sufficient jacket leaves remain for the protection of the curd. In trimming, a cut is made squarely across the leaves, leaving half an inch to one inch projecting above the head.

A carefully cut fringe of leaves around the flower not only contributes to its attractive appearance but also shields the curd from handling injuries, dirt and blemishes. Trimming should be done in a central shed where the heads can be graded and loaded for market.

To Control Weeds in Onions

L. K., of Rosewood, seeks information on the use of sulphuric acid to control weeds in onions, while A. R., of Goomeri, seeks information on the use of weedicides in onions.

Answers: Sulphuric acid is not used widely now as a weedicide in onions. It is dangerous to the operator and corrosive to the metal parts especially of the equipment used. This naturally limits its use. The acid is used at strengths varying from 2 per cent. to 10 per cent. by volume at rates of 100 to 150 gal. per acre. When mixing the solution, add the acid to the water, slowly stirring all the time—never add the water to the acid. The temperature of the mixture rises as the acid is added to the water and could reach boiling point if the acid is added too fast.

Choose a still day to apply the mixture, and should any of it come in contact with the skin, either as the mixture or as the spray, thoroughly wash the affected area immediately to avoid injury.

These Two Commonly Used.

There are two commonly used weedicides in onion culture. These are potassium cyanate and DNOC or Nocweed D.

The former is used when the onions are at the "hook stage", that is up to about four days after germination. It is used at 7 to 10 lb. per acre, following the directions on the container label very carefully. Some suppliers recommend 10 lb. per acre but as the weeds at the hook stage of the onions are very small too, the rate of 7 lb. to 10 lb. will be generally found ample for a good control.

Should the onions be at the three- to four-leaf stage DNOC or Nocweed D will be found generally a more satisfactory weedicide. Follow the manufacturer's instructions carefully and choose for preference a calm, sunny day to spray. Carry out the operation about 9 to 10 a.m.

Fruit Fly Problem In Southern and Central Queensland

By A. W. S. MAY, Senior Entomologist.

This is the first of a series of articles on fruit flies. The remaining articles will deal chiefly with control measures as they apply to the different fruit crops.

Fruit flies are potentially the most important pests of fruit crops in Southern and Central Queensland, and of the many fruits cultivated, only pineapples and strawberries are immune. Few fruit growing areas are free from these pests and the likelihood of damage is of importance to the home gardener as well as to the commercial grower.

In general, fruits ripening between October and April are most subject to infestation, the severity of attack depending chiefly on seasonal conditions prior to fruit maturity and the locality where the fruits are grown.

The successful production of some fruits depends largely on factors such as:

(1) Ripening at a time when fruit fly activity is at a minimum;

(2) Adequate protection by timely applications of a suitable insecticide; and

(3) A regulated and rapid system of harvesting.

Quarantine restrictions and their implementation against fruit grown in Southern and Central Queensland, and in other areas where fruit fly occurs, have in recent years added considerably to the status of these pests.

Species of Importance.

Twenty-five fruit fly species, all native, occur in Southern and Central Queensland, and breed in the fruits of native trees, shrubs and vines. Eight are attracted to, and breed also in, cultivated fruits.

The most destructive species is commonly referred to as the *Queensland fruit fly*. It is somewhat wasp-like in appearance, about one-third of an inch in length though smaller individuals may occur. The general reddish-brown colour is relieved by

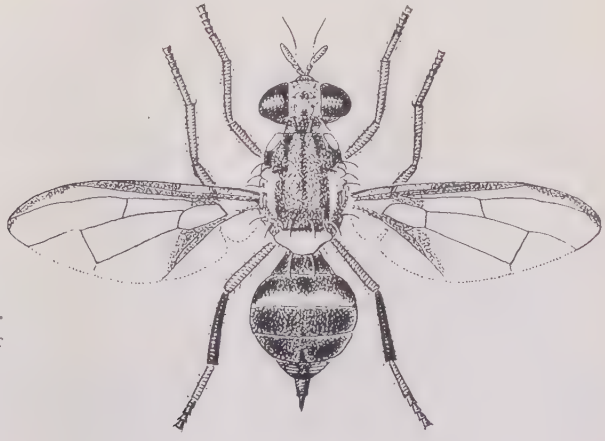


Plate 1.

Queensland fruit fly. Female (six times larger than life size).

patches of bright yellow. The wings are transparent except for a thin brown band along each fore border.

The *Queensland fruit fly* attacks all cultivated fruits with the exception of pineapples, strawberries and fruits of the melon family. It occurs in most settled areas, though more abundantly in coastal regions, where it may damage fruit in all but the coldest months. Prevalence and damage fluctuate from year to year, more markedly in midland and western districts, and the governing factor is rainfall.

Second in importance is the *cucumber fly*, slightly larger than the *Queensland fruit fly*, and coloured a pale yellowish-brown relieved by yellow markings. This species attacks fruits of the melon family in coastal areas during summer. It will breed also in tomatoes and papaws, particularly in the central districts. These fruits are usually damaged by the *Queensland fruit fly* in southern parts of the State.

Six other species, always in association with the *Queensland fruit fly*, breed in cultivated fruits in coastal or subcoastal districts. These play only a minor role, however, in overall fruit fly damage, confining their activities either to a limited range of fruits or within climatic limits. The most important of these are *Jarvis's fruit fly*, which breeds in persimmons and deciduous fruits during the late summer months, the *halfordia fruit fly*, which attacks loquats and varieties of citrus in the wetter coastal districts, and *Perkins's fruit fly*, a late summer pest of tomatoes and citrus in the central districts and wetter southern coastal areas.

Larvae of other species of flies in ripe cultivated fruits are often wrongly identified as fruit fly maggots. The larvae of the *boatman fly*, a small, black-and-cream bodied fly with black speckled wings, may occur in citrus, particularly oranges and mandarins, in coastal districts. Ripe or over-ripe tomatoes in coastal and subcoastal districts are sometimes infested with larvae of a small metallic greenish-black *lonchaeid fly*. Damaged rock melons and pumpkins may contain larvae of a small greyish-brown *rot fly*. These infestations are secondary, and follow either mechanical damage, sunburn, fruit breakdown in wet weather, injury by other insects or fungus attacks.

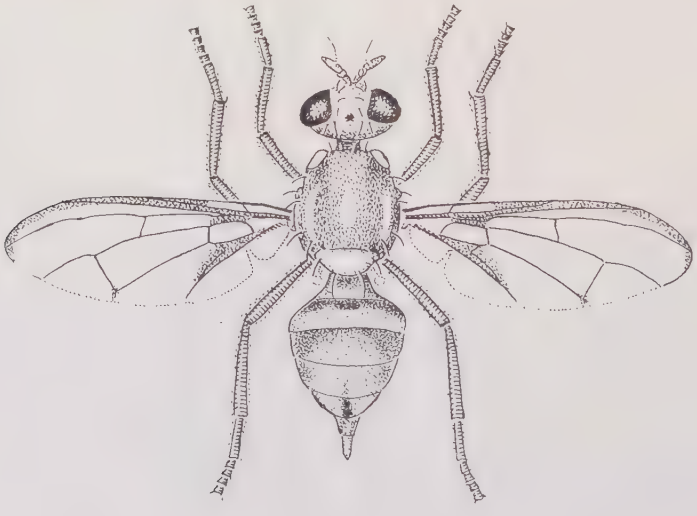


Plate 2.

Cucumber fly. Female (six times larger than life size).

Life History and Damage.

Although fruit flies differ in size and colour, and attack unrelated fruits, their life histories are essentially the same.

The pale cream, elongate and slightly curved eggs are deposited in a small cavity beneath the skin at any stage of fruit development. These are never, as is often supposed, laid in the flowers before fruit-setting. The ovipositor is usually forced directly through the skin or into the outer rind tissues. In tough-skinned fruits such as well developed pumpkins, melons and cucumbers, blemishes or cracks in the skin are chosen, while hail scars and splits in softer fruits are often favoured. As many as seven eggs may be deposited in each puncture.

Egg-laying stings appear as small, discoloured, often blackish spots. These may be masked by an exudation of gum through the puncture, especially in citrus and immature peaches. Some fruit, particularly citrus and tomatoes, colour prematurely in the vicinity of the sting.

Under favourable conditions, the eggs hatch in two or three days in summer, giving rise to creamy maggots that feed and tunnel within the fruit. When eggs are laid in immature fruit, hatching is delayed and proceeds as the fruit approach maturity. At times, the formation of a corky layer around the egg cavity may prevent larval development. In deciduous fruits these blind stings persist as blackened, sunken spots in the skin; in persimmons they appear as firm, blackened spots in the ripening tissues, and in passion fruit as raised, calloused areas. Frequently, eggs in citrus are destroyed by the oil released from cells punctured in the rind during egg-laying: the surrounding tissues may scald, giving rise to brown, sunken areas.

Fruit fly larvae develop rapidly in fruit during summer, attaining full size of one-third of an inch in 7 to 10 days. Under cooler conditions development is much slower, and, as an example, in southern highland districts more than 6 weeks may elapse before larvae hatching in late autumn are full-grown.

Larval tunnelling in fruit often promotes the development of rot organisms. Occasionally, but quite often in citrus, the by-products of decomposition destroy the developing larvae.

Infested fruit are spoilt and usually fall to the ground before maggot development is completed. When full-grown, the larvae cut their way out of the fruit, tunnel into the soil or select moist, sheltered sites beneath the fallen fruit or other debris and change to yellow or brownish pupae.

The pupal stage is completed in less than two weeks in summer but is more prolonged in the autumn. Moisture is essential for survival. On emergence, the fly forces its way to the surface of the soil, ascends a nearby object, expands and dries its wings.

A time interval of 2 to 3 weeks in midsummer or several months in colder weather elapses before newly emerged flies develop eggs.

Habits.

Fruit flies are active when temperatures exceed 60 deg. F., generally moving at random within a district, but concentrating in or near areas carrying susceptible fruits. Under cooler conditions they shelter among foliage in protected situations.

During warm, humid weather, which promotes egg-laying, a rapid concentration of females in fruit trees carrying a maturing crop may suggest a migration into the district. Fruit flies, however, are local, being less active during dry, hot weather when protection is sought among the foliage of leafy trees.

When conditions favour egg-laying the female flies crawl over fruit seeking sites to deposit eggs. In the

Plate 3.

Papaw Infested by *Queensland fruit fly.*

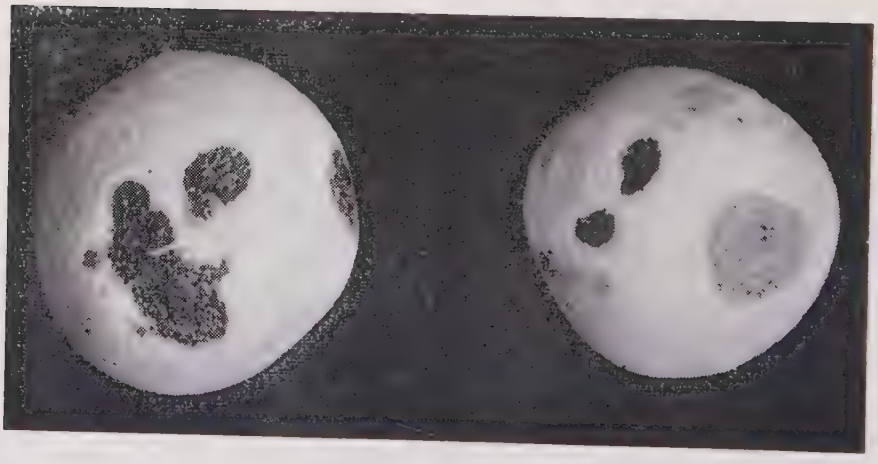


Plate 4.

Blind Stings by *Queensland fruit fly* **in Mandarins, with Scalding of Surrounding Tissues.**

warmer months, this activity may continue from sunrise to sunset. Major egg-laying occurs between mid-day and mid-afternoon.

Fruit flies can survive from 2 to 3 months during summer and for longer periods in cooler weather. Flies that emerge from pupae in the late autumn survive the winter months and infest fruit maturing in spring and early summer.

Influence of Seasonal Conditions.

The severity of damage to fruit crops depends chiefly on the rainfall during fruit development and ripening. Hot, dry, windy weather suppresses fruit fly activity, and if prolonged may so reduce breeding that levels of population fall considerably.

Good rains in spring and early summer promote the likelihood of major damage in early maturing stone fruit crops. Fruit fly may damage these crops in far western districts following a good early season, yet be of little consequence in the same season in subcoastal and highland districts which may have missed good spring and early summer rains.

The rainfall in February and March likewise influences breeding in citrus and other fruits maturing in late summer and autumn. In coastal, highland and inland districts a prolonged wet season associated with above-normal temperatures promotes breeding in citrus fruits well into April.

Mid-season varieties of citrus as well as other plantation fruit crops may be attacked as late as June in coastal areas, especially in central districts.

Low rainfall in late summer, followed by a dry autumn, prevents major breeding in this period and fruit fly numbers will be low in the following spring.

Control.

Populations of the more important economic species of fruit fly that may arise each season from breeding in native fruits are of far less commercial significance than those arising from orchard and garden fruits growing in settled areas.

Four species of *native wasp parasites* may, in some years, influence the extent of fly emergence from native fruits. This, however, serves no useful purpose in reducing losses in orchards, and, furthermore, parasitism in cultivated fruits is very rare. No practical help therefore can be expected from parasites in the economic control of these pests.

A sequence of cultivated fruits is available for fruit fly breeding throughout the spring, summer and autumn in most districts. The influence of rainfall and atmospheric humidity determines the damage experienced. The likelihood of damage to cultivated fruit is therefore ever present and only the use of well-timed, adequate control measures can prevent damage once conditions favour fruit fly activity.

Timing Control Measures.

Fruit fly numbers follow a general pattern from season to season within districts. No hard and fast rule, however, can be adopted to forecast either the time of commencement or severity of fly activity as a fruit crop approaches maturity. These will vary from district to district.

It is unwise to rely on visual observation to reveal fruit fly activity, as the first indication will be the stinging of the most forward fruit. From experience, growers may anticipate the likelihood of damage each year, and apply control measures accordingly. It is more practical, however, to employ a method that will reveal the presence and activity of flies in trees carrying susceptible fruit before any damage is done. This may be accomplished by placing lure traps

strategically within or near a developing fruit crop, and servicing these at regular intervals.

Six to 10 traps, hung singly, away from the direct rays of the sun, in leafy trees, should be placed in position well in advance of the expected date of harvest. The results from regular inspections will indicate the timing of control measures.

A reliable stock lure formula is:

10 oz. pulped orange
½ oz. rock ammonia (ammonium carbonate)
1 pint water.

An equivalent quantity of other soft fruits may be substituted for the orange. This stock lure will store for several months in a well-stoppered bottle if a preservative is added. To charge the traps, 1 part of stock lure is mixed with 30 parts of water.

CONTROL MEASURES.

Cultural.

Fruits such as bananas, papaws, persimmons, custard apples, mangoes and certain varieties of citrus are stung only if allowed to ripen on the

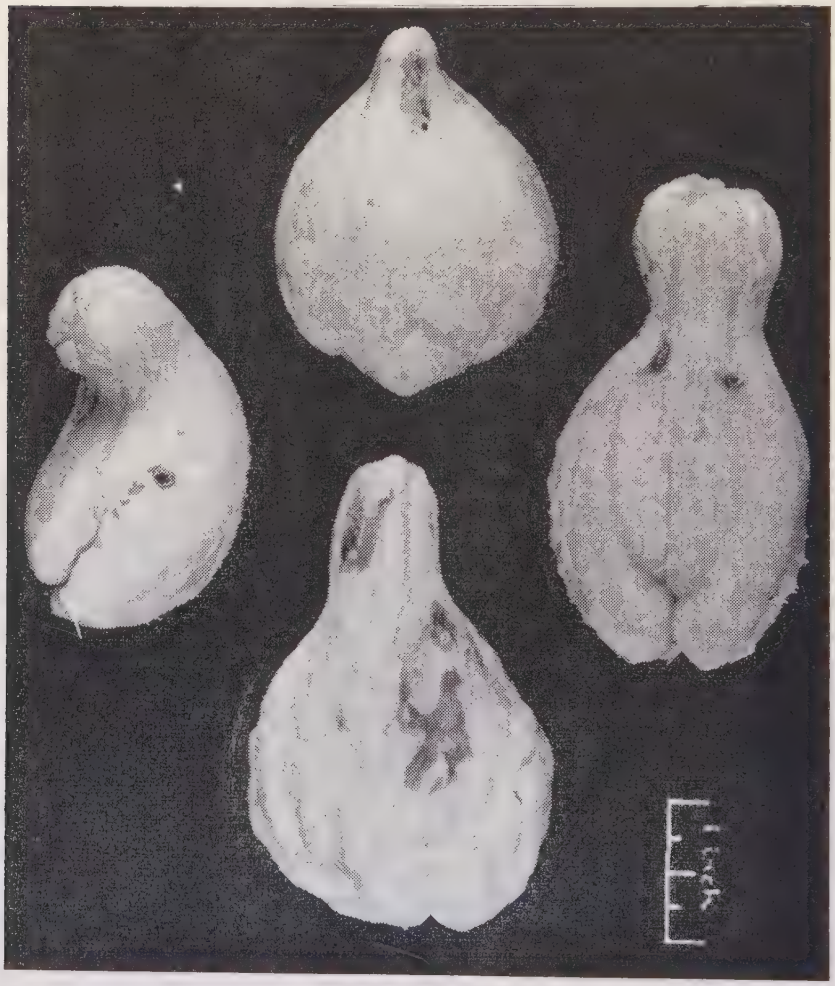


Plate 5.

Chokos Damaged by *cucumber fly.* The scar tissue is the result of egg laying when fruit was newly formed.

trees. Harvesting of these in the green—mature state is both practical and effective in preventing damage.

The use of early-maturing varieties of stone fruit is effective in some districts.

Prompt harvesting once fruits reach maturity will also reduce the likelihood of fruit fly attack.

Both these measures, although effective in normal years may fail in seasons that favour intense fly activity.

The collection and destruction of infested fruit, though a long-established practice in orchard management, serves little purpose in reducing the possibility of fruit fly attack in subsequent crops. The longevity of fruit flies and their habit of drifting freely within districts do not help individual or organised efforts in this regard. Also, several weeks or even months may elapse between egg-laying in a fruit crop and the time when the resultant progeny may deposit eggs. During this time interval seasonal conditions alone often nullify the potential importance of the earlier breeding.

Chemical.

Trials have been made with many formulae for baits containing a poison mixed with a food substance attractive to the flies and splashed on the foliage, but none has proved satisfactory. Their attractiveness is shortlived in dry weather, while during periods of frequent rain, when fruit flies are most active, they cannot be maintained satisfactorily.

In southern and central Queensland insecticide cover sprays have proved the most effective means of preventing fruit fly damage. These should be applied when lure traps indicate fruit fly activity, and should be repeated at weekly or fortnightly intervals until harvest, or while the flies are active. DDT is the most efficacious insecticide for this purpose.

Spray strength, and time, frequency and method of spray application required for best results, frequently differ with the crop to be protected. These and other relevant details will be discussed under crop headings in future issues.

SCIENTIFIC NAMES.

Fruit Flies.

Queensland fruit fly ..	*Strumeta tryoni* (Frogg.)
Cucumber fly	*Austrodacus cucumis* (French)
Jarvis's fruit fly ..	*Afrodacus jarvisi* (Tryon)
Halfordia fruit fly ..	*Strumeta halfordiae* (Tryon)
Perkins's fruit fly ..	*Strumeta humeralis* (Perk.)

Fruit Fly Parasites.

Opius? africanus Szep.
Opius fletcheri Silv.
Opius kraussi Full.
Opius tryoni Cam.

Secondary Insects.

Boatman fly	*Rioxa pornia* (Walk.) (fam. Trypetidae)
Lonchaeid fly	*Lonchaea aurea* Macq. (fam. Lonchaeidae)
Cucurbit rot fly	*Atherigona* sp. (fam. Anthomyiidae)

[TO BE CONTINUED.]

Tuberculosis-Free Cattle Herds. (As at 1st March, 1958.)

Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongalea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy.
Sullivan Bros., "Valera" Stud, Pittsworth
Reushle Bros., "Reubydale" Stud, Ravensbourne
H. F. Marquardt, "Chelmer" Stud, Wondai
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H.M. State Farm, Numinbah
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Woowoonga, *via* Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham

Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
W. E. O. Meir and Son, "Kingsford" Stud, Alberton, *via* Yatala
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnson, "Windsor" Jersey Stud, Beaudesert
W. S. Kirby, Tinana, Maryborough
S. A. Cramb, Bridge st., Wilsonton, *via* Toowoomba
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgeldie

Poll Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick.
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi.

Control Of Potato Pests In South Queensland

By A. W. S. MAY, Senior Entomologist, and G. H. S. HOOPER, Assistant Entomologist.

The successful cultivation and marketing of irrigated potatoes in southern Queensland often depend on the timely and effective control of several important insect pests.

These pests are met chiefly in the spring crop when the harvest coincides with a keen demand for sound, good quality tubers. The prevention of pest damage in this crop is therefore of major importance and should be considered an integral part of normal cultural practices.

Though pests may attack plants of the autumn crop, damage is of much less significance and routine preventative treatments are seldom required.

PESTS OF IMPORTANCE.

The *potato tuber moth* is by far the most destructive pest. Though more usually considered a pest of the tubers, both prior to harvest and in storage, larvae also damage the tops and this can interfere with normal plant development and materially reduce yields.

Overwintering moths deposit eggs on the leaves soon after the plants appear above ground, and the resulting larvae skeletonise the leaf tissues or burrow into the growing points of the stems. Larval damage in the tops increases as new generations of the pest develop and often attains serious proportions in hot, dry seasons. Complete plant defoliation may then occur before tubers are formed.

As the crop approaches maturity the moths place eggs on the tubers should these become exposed or accessible through cracks in the soil. When the tops wilt or dry out the larvae will also migrate to unprotected tubers.

Potato tuber moth may remain active in the field during summer in volunteer potato plants, discarded tubers and alternative hosts such as tobacco and some native related plants, as well as in stored tubers. Numbers wane, however, with the approach of cooler weather, and this pest is rarely of major importance in autumn crops. On the other hand, low rainfall and high temperatures at this time of the year may induce abnormal pest activity with resulting damage to tops and tubers.

The *leaf-eating ladybird* may infest plants in the pre-flowering period. Masses of creamy eggs are laid on the under-surface of leaves and the spiny, yellowish larvae skeletonise the tissues. If unchecked, serious plant defoliation will result.

The *potato aphid* and *thrips* infest the new growth in early spring and may be prevalent in dry, hot seasons. Though their feeding retards normal plant development they are of minor importance in well-grown crops.

Jassids or *leafhoppers* may infest crops in early spring, but are of more importance in autumn crops in dry seasons. Their feeding punctures cause a white stippling of leaves. If they are prevalent, jassids will retard plant growth.

The *potato broad mite* may spread from weed growth adjacent to potato fields and infest crops in autumn, feeding on the under-surfaces of leaves, causing a general brown discoloration, leaf distortion and plant stunting. Infestations increase rapidly following applications of DDT to the crops.

Adults of the *green vegetable bug* migrate to potato crops in the spring and feed by sucking plant juices from the stems and leaf stalks. Should the infestation be severe and breeding occur, plant growth may be checked.

CONTROL MEASURES IN THE FIELD.

As the pest complex and the status of each pest in the spring and autumn crops differ greatly, control measures warrant consideration on a seasonal basis.

Spring Crop.

Other pests of the spring crop are automatically checked following treatments applied for *potato tuber moth* control, and every effort should be made to prevent this pest attaining populations that may cause irreparable damage to the plants. Cultural and chemical methods can be combined to achieve this end.

Pre-flowering.

Until flowering commences, the plants should be given good conditions for development. Uninterrupted top growth during this period will ensure maximum tuber formation.

Plate 1.
Foliage Damaged by the Potato Tuber Moth.

DDT should be applied to prevent larval damage to the tops and to check infestations of *aphid, jassids, thrips,* the *leaf-eating ladybird* and other potato foliage pests. Dieldrin and endrin are alternative insecticides for *potato tuber moth* control, but in addition to being more costly, may not prove as satisfactory as DDT in checking all foliage pests.

Post-flowering.

Top protection is also essential during the post-flowering period to ensure tuber development.

Insecticidal application may not entirely prevent attacks on tubers as the crop approaches maturity; therefore as an added precaution the plants should be hilled.

As hilling, if too early, can interfere with tuber formation, this operation should commence after the majority of tubers are formed but before these develop sufficiently to crack the soil. Hills should be maintained until harvest, particularly when the soil is prone to cracking.

Timing of Insecticide Applications.

Spray applications should commence soon after moths are first noticed in the field, and should continue while moths are present.

Two treatments, and possibly a third, spaced two to three weeks apart, will be sufficient to prevent damage in the tops, and to reduce the likelihood of a large infestation developing before harvest.

Harvesting.

Harvesting should not be delayed after the tubers have reached maturity. If this is unavoidable during dry weather, hilling should be continued or light spray irrigation used to prevent serious ground cracking.

As the tubers are bagged in the field they should be treated with a 2 per cent. DDT dust at the rate of half a pound per bag. To overcome the disadvantages of an unsightly residue, a brown pigmented DDT dust may be used to treat potatoes destined for table use.

A convenient method of dusting the tubers is to place a small amount of

Plate 2.

Potatoes Effectively Hilled Against Tuber Infestation by the Potato Tuber Moth.

dust in the bottom of the tin used for picking up each time before it is filled.

Preparations containing BHC or lindane should not be used, as the resultant taint will render the tubers unfit for eating.

As larvae quickly migrate from the rapidly wilting tops and moths lay eggs on exposed tubers, the sequence of digging, dusting and bagging should be a quick and continuous operation.

Autumn Crop.

In contrast to the spring crop, pests are only of incidental importance in the autumn. *Jassids,* the *leaf eating ladybird* and *potato tuber moth* may present a problem should dry warm weather prevail.

Routine applications of insecticide are not required, treatments being reserved to check infestations if any develop.

The choice of insecticide for this crop will depend largely on relative cost and availability. In areas where *potato broad mite* has presented a problem in the past, the use of DDT may increase the status of this pest and either dieldrin or endrin is to be preferred.

RATES OF INSECTICIDE APPLICATION.

DDT, preferably in spray form, should be applied at the rate of 1 lb. per acre at each application. Dieldrin and endrin when used as an alternative to DDT, are applied respectively at the rate of ½ and ¼ lb. per acre at each application.

When spraying, good plant coverage is essential. Faulty timing and application, as well as inadequate hilling, can prejudice control despite the use of the recommended amounts of insecticide.

Plate 3.

Portion of a Plant Infested by the Potato Broad Mite.

CONTROL MEASURES IN STORAGE.

Stored potatoes, including seed set aside for the next crop, are protected from tuber moth **attack by thorough treatment with 2 per cent. DDT dust at the rate of ½ lb. per bag.**

An alternative and equally effective method entails the storage of tubers in bags that have dried after being dipped in a 2 per cent. DDT emulsion.

To reduce the likelihood of rots developing during storage, only reasonably sound potatoes should be placed in the bags.

Any DDT persisting after storage is lost during handling and preparation for the table and does not constitute a hazard to the consumer.

Scientific Names of Pests.

Potato tuber moth	*Gnorimoschema operculella* (Zell.)
Leaf-eating ladybird	*Epilachna* 28-*punctata* Fabr.
Jassids	*Austroasca viridigrisea* (Paoli)
	Orosius argentatus (Evans)
Potato broad mite	*Hemitarsonemus latus* (Banks)
Potato aphid	*Macrosiphum euphorbiae* (Thom.)
Thrips	*Thrips tabaci* Lind.
Green vegetable bug	*Nezara viridula* L.

Growing Green Panic and Buffel with Lucerne

A. M., of Kilcoy, has inquired about the performance of green panic and buffel grasses, with particular reference to planting rates and times, and the possibility of growing these grasses with lucerne.

Answer: Both of these grasses can be planted from spring until early February. However, experience indicates that the best time is from mid-January on, when the monsoonal rains usually provide a long period of wet weather. The seeding rates for these grasses are 4 to 5 lb. per acre for green panic and 4 to 5 lb. per acre for buffel grass. If seed with a germination of 20 per cent. or more is used, the planting rates should be reduced; thus reducing the cost of the pasture.

Lucerne is a very good legume to grow in association with these grasses, provided that the soil fertility level and conditions are fairly suitable to lucerne. Pastures of green panic and lucerne now almost six years old have again provided heavy feed following the relief rain on the Northern Downs. Rotational grazing will ensure a long life for lucerne in pastures. Planting rate of 1 to 2 lb. per acre is all that is required.

Given ideal conditions the grasses may be grazed about eight to 10 weeks after planting but care is necessary as the grasses may not be properly established. The area should be ready to graze again, under reasonably good conditions, every six to seven weeks during the main growing season.

Brucellosis-Tested Swine Herds

(As at 1st March, 1958.)

Berkshire.

A. P. and N. Beatty, "Deepdene," Barambah road, Nanango
S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
J. H. N. Stoodley, "Stoodville," Ormiston
H.M. State Farm, Numinbah
G. L. Gbanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfeld" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
B. Osborne and Dr. J. W. Best, Miltown Stud Piggery, Warwick
W. Young, Kybong, via Gympie
H. H. Sellars, "Allambie" Stud, Tabooba, Beaudesert
E. J. Clarke, Mt. Alford, *via* Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
J. W. Bukowski, "Secreto" Stud, Oxley
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
D. Ludwig, Cainable, via Beaudesert

Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
B. J. Jensen, "Bremerside" Stud, Rosevale, *via* Rosewood.
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
V. P. McGoldrick, "Fairymeadow" Stud, Cooroy
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabarlah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
K. B. Jones, "Cefn" Stud, Pilton road, Clifton
O. B. Vidler, Manneum, Kingaroy
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
B. F. Jensen, Rosevale
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba.
P. F. Ives, Capalaba
D. Ludwig, Cainable, via Beaudesert
J. C. Lees, "Bridge View" Stud, Yandina

Tamworth.

D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
F. N. Hales, Kerry road, Beaudesert
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook

Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville
R. A. Collings, "Rutholme" Stud, Waterford

Plate 1.
Santa Gertrudis-Hereford Cross-bred Calves Shortly After Birth at "Eidsvold" Station, December, 1954.

Santa Gertrudis—Hereford Cross Gave More Weight

By J. J. SULLIVAN and L. A. WILLIS, Cattle Husbandry Branch.

Santa Gertrudis–Hereford cross steers on native pastures in the Burnett district gained an average of 879·4 lb. a head in 774 days compared with 708·7 lb. by Hereford steers under identical conditions.

This is an average gain of nearly 1·2 lb. a day by the Santa Gertrudis cross cattle and 0·9 lb. a day by the Herefords.

Regular weighings of 34 head of cattle were made by the Department of Agriculture and Stock from March, 1955, till the steers were slaughtered in May, 1957.

Carcass appraisal results were slightly in favour of the cross-breds. At ruling market prices the cross-breds returned an extra £6 2s. 6d. a head compared with the Herefords.

Conditions during the vital period are described in this article and the results of the weighings are discussed.

The trial was carried out at "Eidsvold" Station, a property in which the family of the present owners, Messrs. E. B. & R. Joyce, have had an interest for over 50 years. Before 1942, a breeding policy of crossing Herefords and Shorthorns was pursued. During the

10 years from 1942 to 1952 the herd was graded up to Herefords by the use of top quality bulls. The "Eidsvold" Hereford herd is noted for its uniformity, good conformation and fleshing quality.

In 1952 Messrs. Joyce Bros. decided to introduce Santa Gertrudis cattle to determine whether this breed would be better suited to their conditions. They were looking for more beef per acre. This programme was commenced in November, 1953, with the purchase of three Santa Gertrudis bulls. Altogether 14 Santa Gertrudis bulls and 10 Santa Gertrudis heifers have now been purchased. These form the pure-bred nucleus which is being used to grade up the Hereford herd to the Santa Gertrudis breed.

In November, 1954, the Agriculture and Stock Department installed a weighbridge at "Eidsvold" Station. A weighing programme was designed to compare growth rates of Hereford steers with Santa Gertrudis–Hereford steers run under identical conditions.

Plate 2.

Santa Gertrudis-Hereford Steers Aged 7 to 8 Months.

Description of Property.

"Eidsvold" Station is situated on the Burnett River 5 miles west of Eidsvold township in the Central Burnett district. It is just south of the Tropic of Capricorn and lies between 25 deg. and 26 deg. south latitude.

There are two distinct types of vegetation. The portion known as "Barrule" contains several thousand acres of brigalow scrub country. This has been cleared and seeded with Rhodes grass, green panic and buffel grass with a sprinkling of lucerne. Sixty acres of this improved pasture were available to the steers during the winter of 1955.

Open forest land is grassed mainly with black spear and forest blue grass, locally known as Burnett blue grass. Queensland blue grass is scattered in the forest land and dominant on the small creek flats. Other quick-growing annuals and a small variety of native legumes also appear in the forest country.

Ring-barking has been used to reduce the timber cover of both broad- and narrow-leaved ironbark. This was the main tree growth on the ridges and slopes of the forest country. Blue gums and apple trees appear in the more fertile creek pockets.

Permanent creek water was freely available to all steers throughout the whole period.

The property is in the 26-28 inch rainfall belt. Storm rains are generally experienced in November and December and are followed usually by good rains during January, February and March. Only light winter rains are normally recorded.

Throughout the trial period the temperament of the steers was carefully observed. Both the Hereford and the cross-bred steers were of a docile temperament.

Management.

The cows and calves used in this project were grazed at "Eidsvold" Station till May 16, 1955. They were then taken to "Barrule," where they remained till October 11, 1955, to provide better winter grazing.

Plate 3.
Hereford Steers Aged 7 to 8 Months.

Description of Cattle.

The Hereford dams of all the steers used in this growth rate comparison were of uniformly good quality. These cows were sired by Hereford bulls from "Ennisview" stud.

Bulls from this stud were used for a number of years in a breeding programme to grade up the "Eidsvold" Station Hereford herd.

The Hereford dams of the Hereford steer group were selected to be mated with the Santa Gertrudis bulls the following season.

Pure-bred Santa Gertrudis bulls were purchased from "Risdon" stud for this cross-breeding project.

At "Barrule" all the ear-tagged calves and their mothers were run in the one paddock. On October 11, 1955, the calves were weaned and driven to "Eidsvold" Station, where they were weighed on October 14, 1955.

After weighing, the steers were put into a 200-acre paddock at "Eidsvold" Station, where they were kept until railed to Gladstone for slaughter. This paddock had been spelled for several months before the steers were put in.

Stocking rate in the steer paddock was approximately 1 beast to 6 acres.

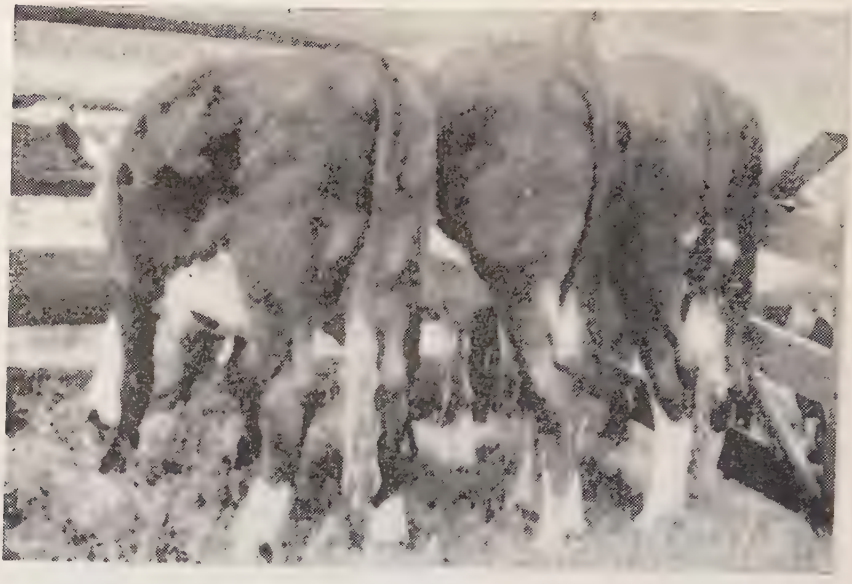


Plate 4.

Hereford Steers Aged 27 to 28 Months. Average weight 925 lb.

Plate 5.

Santa Gertrudis-Hereford Steers Aged 27 to 28 Months. Average weight 1,086 lb.

—	Hereford Steers.	S. G. x Herefords.
Liveweight 29–4–57	965 lb.	1,157 lb.
Dressed weight 2–5–57 ..	465 lb. (chilled)	579 lb. (chilled)
Dressing %	47–52·5% (Av. 48·2%)	49·5–53·5% (Av. 50%)
Grading	90% baby beef 10% 1st quality	100% baby beef
Carcass Appraisal Score ..	41 points	51 points

While at "Barrule" the majority of the cross-breds had what appeared to be a severe infestation of ringworm. This infestation had cleared up before weaning but may have had an adverse effect on their growth rate during the winter of 1955. Only two Herefords showed any evidence of this infestation.

The standard of management on "Eidsvold" Station is high. Stock are quiet and easy to handle both in the paddock and in the yards.

On November 18, 1955, the lightest steers from each group were culled, leaving 17 Santa Gertrudis–Herefords out of 21 and 17 Herefords out of 18. A total of 34 was considered to be the maximum which could be grazed in the 200-acre paddock available at "Eidsvold" Station. It is noteworthy that there was available a greater number of cross-breds from which the trial group was taken.

The steers were dipped for tick and buffalo fly control at 5-weekly intervals which corresponded with the weighing intervals. This kept all steers relatively free from ticks. In fact, an outbreak of tick fever occurred in April, 1957, when the cattle were moved to a tick-infested paddock. Two deaths occurred in the Hereford group.

Routine vaccinations for blackleg were done.

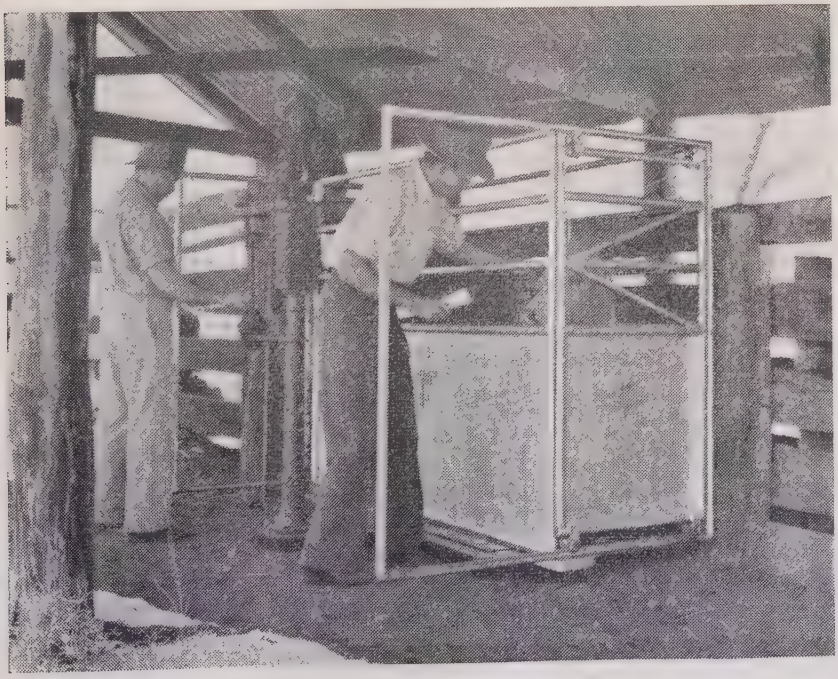


Plate 6.

Weighing Steers at "Eidsvold" Station.

There was evidence of ephemeral fever ("three-day sickness") in the cattle in December, 1955. The attack was apparently slight and did not appear to have any permanent effect on growth.

Identification and Weighing.

On March 15, 1955, the cows and calves were identified by means of numbered aluminium ear tags and then weighed. The calves were then between 2 and 3 months old.

Thereafter, the steers were weighed at approximately 5-weekly intervals until slaughtered. This programme was interrupted when the stock were moved to "Barrule" in 1955.

The steers were normally yarded about 8.30 a.m. and weighing commenced at 9 a.m. On the completion of weighing the steers were dipped and returned to their paddock.

Weights of Dams.

The dams of all steers were weighed on March 15, 1955. Their uniformity is shown by the average weights, which were:—

	lb.
Dams of Hereford steers ..	936.6
Dams of cross-bred steers ..	933.5

Liveweight Gains.

Plate 8 shows liveweights recorded from March 15, 1955, when the steers

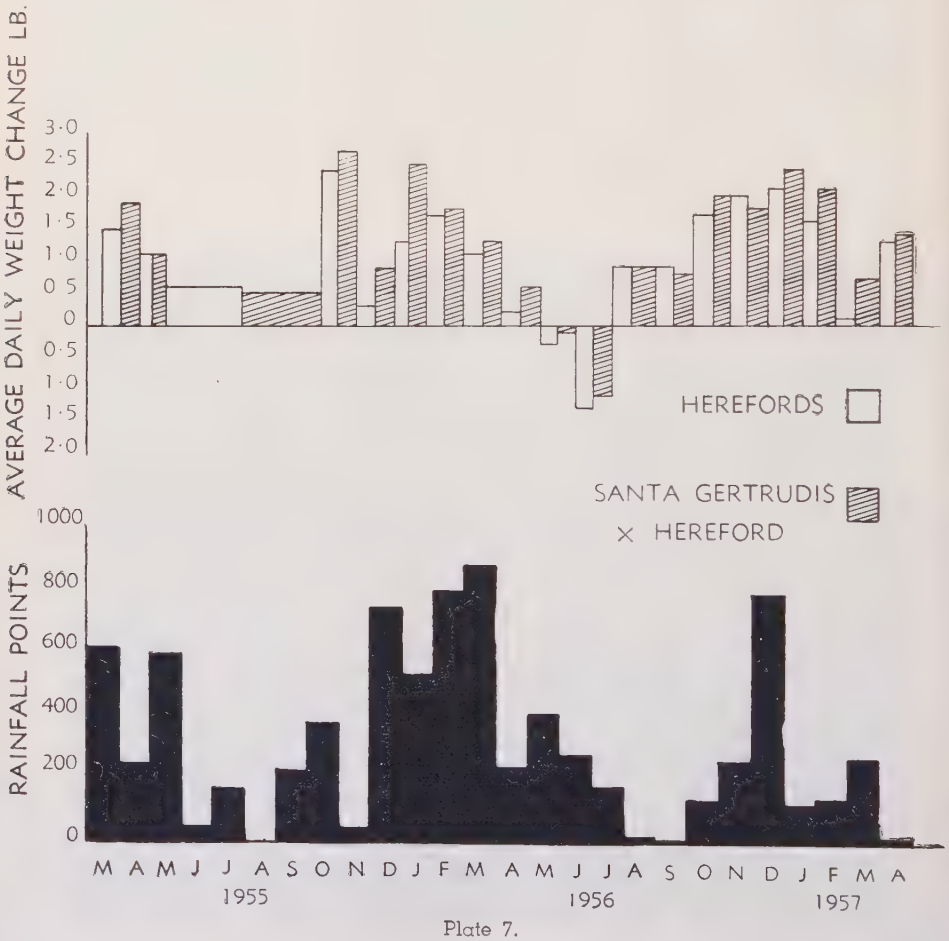


Plate 7.

Growth Rate of Steers in Relation to Rainfall.

were between 2 and 3 months of age till April 29, 1957, just prior to their slaughter on May 2, 1957, when they were between 28 and 29 months old.

Average daily rate of weight change and rainfall are shown in Plate 7.

At initial weighing on March 15, 1955, the cross-bred steers averaged 21.3 lb. heavier than the Herefords.

At weaning on October 14, 1955, the cross-breds averaged 19.6 lb. heavier than the Herefords, so that from initial weighing between 2 and 3 months old till weaning (between 9 and 10 months old) the growth rate was practically the same for both groups. This period of growth is largely influenced by the dams. It illustrates the uniformity of the dams as indicated by their liveweights mentioned earlier.

On April 28, 1957, the cross-breds averaged 192 lb. heavier than the Herefords. This represents an approximate daily gain of 1·2 lb. per head for the cross-breds and 0.9 lb. for the Herefords.

From March 15, 1955, to April 28, 1957 the cross-breds gained 192—21·3=170·7 lb. more liveweight than the Herefords. Of this gain 106 lb. was made in the first 6 months after weaning.

Slaughter and Grading Results.

The steers were slaughtered at Swifts Meatworks, Gladstone, on May 2, 1957. Carcasses were appraised by Mr. A. A. Seawright, Veterinary Officer, of the Department of Agriculture and Stock.

The weight range in carcasses for the Santa Gertrudis and Hereford steers was 537 to 638 lb. dressed, while the Hereford steers ranged from 413 to 572 lb. dressed weight.

Plate 8.

The poor dressing percentage would be due to the dry seasonal conditions experienced before slaughter of these steers. The fact that lieveweights recorded were non-fasting weights would, to a certain extent, account for the low dressing percentage.

In conformation and finish the Santa Gertrudis–Hereford group was ahead in points and visual appraisal.

In weight of hindquarters the Santa Gertrudis–Hereford averaged 0·4 per cent. heavier than the Herefords, the crossbred steers averaging 52·3 per cent. of the total as against 51·9 per cent. for the Herefords.

There was a difference of 114 lb. in the chilled dressed weight in favour of the cross-breds.

After all expenses had been paid, the Santa Gertrudis–Hereford steers returned £30 5s., against £24 2s. 6d. for the Herefords, that is, a difference of £6 2s. 6d. a head.

Acknowledgement.

It is desired to acknowledge with appreciation the co-operation of Messrs. E. B. & R. Joyce, who have given valuable assistance in this work.

A Letter from BALLYRANDOO

My Dear Son,

Your mother and I are always glad to get your letters. It's good to know you are settling down in your first overseer's billet on a well-run sheep station. I miss your help in the running of our place, and no doubt it will be your place some day, so will do all my old bones can to keep it going well for you. You said that I know more about the land after 60 years on Bally. than you can ever learn, but it is a young man's world to-day. Mechanisation and research are changing many things for the sheepman. At least our both being on the land makes it easier for me to write my not-too-frequent letters to you, for, in your mother's words, "you sheepmen never have anything to talk about but sheep!" I am afraid it's very true.

Yesterday I went over to see J., who had a couple of our sheep that apparently turned up in a muster. He was drenching his sheep with bluestone-nicotine sulphate, and had a bit of a problem on his hands. The weather was very hot, and the sheep carrying a pretty heavy worm burden. The sheep had been mustered to the yards that morning. Fifteen sheep had died and the drenching was held up. After lunch he rang the local Sheep and Wool Adviser, who reminded J. that in the pack of copper sulphate and nicotine sulphate he was using there was 1 lb. of each. He told J. to cut down the nicotine sulphate from 16 oz. to 12 oz. at times when there is hot weather and the sheep very anaemic, and to take care to use the lower dose rates prescribed when drenching young sheep. Very sound advice too, as we both know from previous experience.

Affectionately,

Dad.

Queensland Fauna Sanctuaries

By C. ROFF, Fauna Officer.

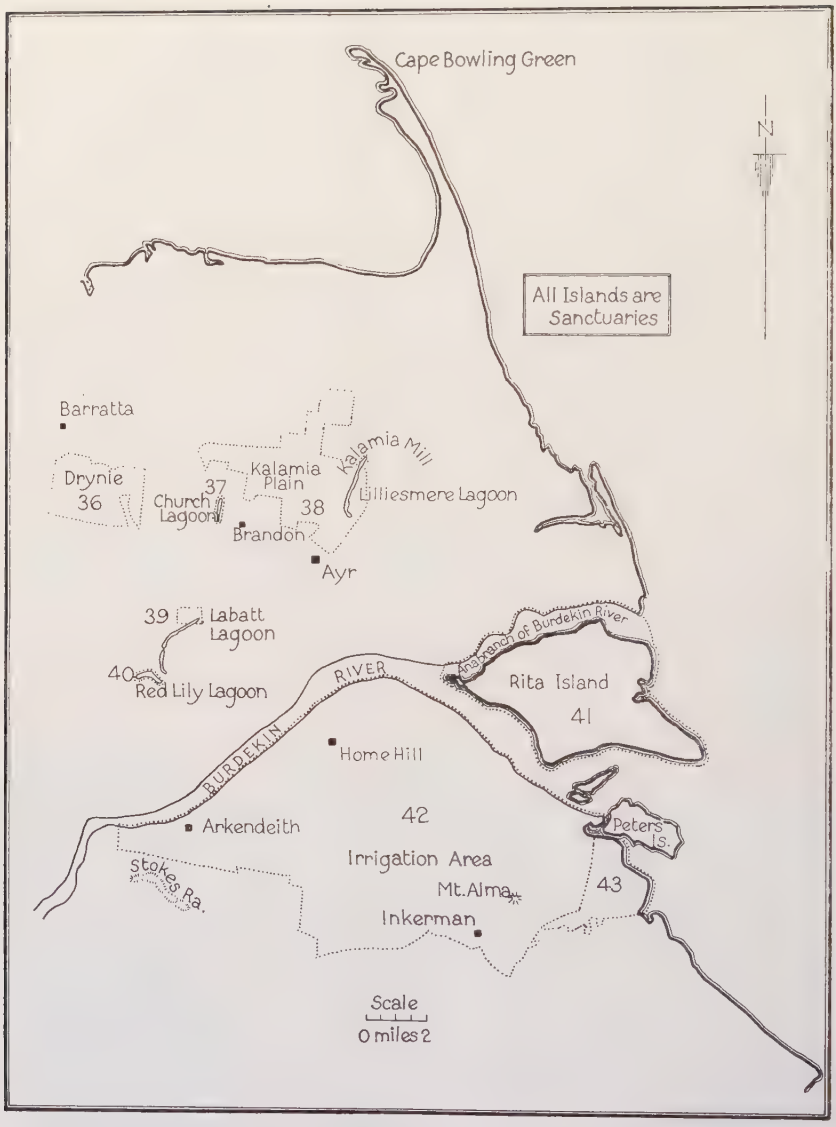
(*Continued from page* 114, *February*, 1958.)

The following is an index of the sanctuaries outlined in Map 6.

Index No.	Sanctuary.	Area in Acres.
36	Properties of James, John and F. E. Burke, Drynie, via Brandon	4,622
37	Pioneer Church Lagoon, Brandon	25
38	Sheep Station Creek, via Brandon	4,940
	Kalamia Plain, Ayr	2,000
	Lilliesmere Lagoon, Kalamia Mill	2,886
39	Part of Labatt Lagoon, property of L. N. and F. Kelly, Brandon	342
40	Red Lily Lagoon, via Ayr	50
41	Rita Island and Foreshores of Burdekin River and Anabranch, via Ayr	19,072
42	Irrigation Area, Inkerman	59,380
43	Occupation Lease No. 375, Portion 41, Parish of Upstart, Groper Creek, via Home Hill	2,880

Plate 5.

Wild Ducks in Flight, Labatt Lagoon Sanctuary, via Brandon.



Map 6.

Map Showing Sanctuaries in Part of Fauna District No. 3. The sanctuary boundaries are delineated by dotted lines (As at December 31, 1957).

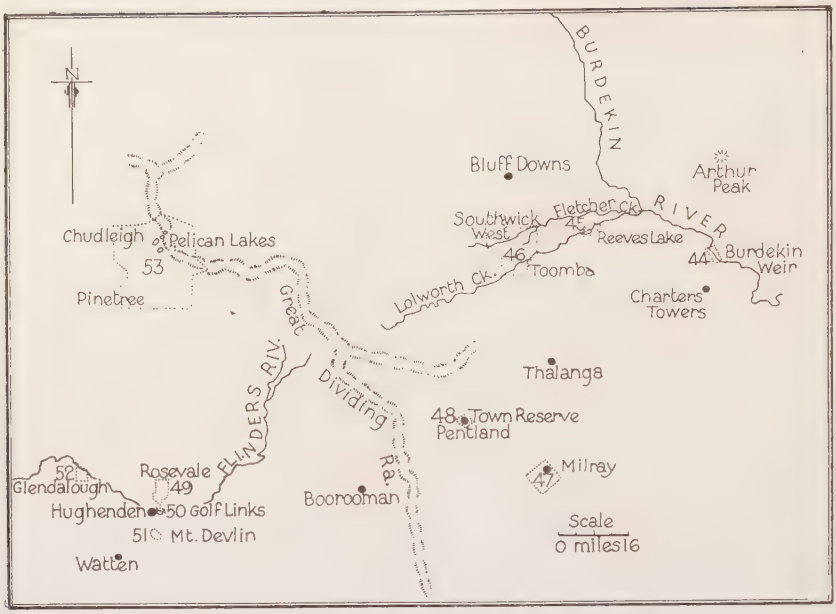
The following is an index of the sanctuaries outlined in Map 7.

Index No.	Sanctuary.	Area in Acres.
44	Burdekin Weir, via Charters Towers	810
45	Reeves Lake, Lolworth Creek Reed beds and La Batt's Lake, via Charters Towers	5,880
46	Southwick West, via Charters Towers	34,909
	Toomba Stud Holding, via Charters Towers	40,960
47	Milray Lagoon and Swamp, via Pentland	15,360
48	Town Reserve Dam and Swamp, Pentland	250
49	Rosevale Station, Hughenden	12,081
50	Golf Links, Hughenden	1,659
51	Mount Devlin Holding, Hughenden	3,286
52	Glendalough Station, Hughenden	1,717
53	Chudleigh Park, Pine Tree and other Holdings, via Hughenden	268,800

Plate 6.

An Island Sanctuary, Green Island, via Cairns.

[*Photograph by Department of Forestry.*



Map 7.

Map Showing Sanctuaries in Part of Fauna Districts Nos. 3 and 6. The sanctuary boundaries are delineated by dotted lines (As at December 31, 1957).

(TO BE CONTINUED.)

Questions From Farmers

J.N., of Warwick, asks if cow cane could be used as a windbreak for small crops.

Answer: While cow cane or fodder cane has been used successfully to some degree as a windbreak for small crops on coastal farms, the climatic conditions on the Darling Downs will not suit the plant.

A windbreak of athel trees may be more suitable for J.N.'s purpose provided that the presence of these trees will not retard the progressive growth of small crops.

☆ ☆ ☆

K.L., of Dimbulah, asks if there is any known weedicide which could be used to control grass growth in the rows of potatoes which are just breaking through the soil. Inter-row cultivation has reduced the invasion but not around the young plants.

Answer: Potatoes, like other plants belonging to the same botanical family, tomatoes and tobacco, are very susceptible to injury from hormone sprays. Even extraordinarily small amounts of the sprays may prove disastrous to the crop. The slight drift that may come from nearby fields being treated with weedicide sprays may cause trouble in the potato field.

It will be readily appreciated that no suitable spray can be recommended to help K.L. overcome his trouble.

☆ ☆ ☆

M.B., of Gatton, has inquired if there is any way of treating pumpkin seeds before planting.

Answer: Probably the most common method of treating pumpkin seed before planting is to induce sprouting by placing the seed between two pieces of dampened flannel kept in a warm place until ready to plant.

Bags may be used instead of flannel but will generally be found less effective as the flannel holds the moisture better and is warmer.

List of Fertilizers Registered Under "The Agricultural Standards Act of 1952."

Compiled by Registration Officers of the Standards Branch, Division of Marketing.

(*Continued from page* 120, *January*, 1958.)

MIXED FERTILIZERS—*continued.*

Grade Formula.	Name of Preparation.	Guaranteed Analysis.											Queensland Primary Dealer.
		Percentage Nitrogen (N) as			Percentage Phosphoric Acid (P_2O_5) as			Percentage Potash (K_2O) as		Percentage Miscellaneous.	Percentage Fine.	Percentage Coarse.	
		Nitrate of Soda.	Sulphate of Ammonia.	Blood, Bone & Offal.	Water Sol. Super.	Insol. Super.	Bone.	Sulphate.	Chloride.				
7·0–11·0–10·0 ..	GF 5	..	5·0	2·0	2·0	..	9·0	..	10·0	..	90	10	General Fertilisers Ltd.
7·0–11·75–5·0 ..	ACF B 4	..	6·0	1·0	8·0	0·5	3·25	..	5·0	..	85	15	A.C.F. & Shirleys Fertilizers Ltd.
7·0–12·0–5·0 ..	ACF B 4 Q	..	7·0	..	11·5	0·5	..	..	5·0	..	..	..	ditto
7·0–12·25–5·0 ..	ACF B 4 Q (Gam. 50) ..	..	7·0	..	11·5	0·75	..	..	5·0	0·06 gamma isomer of benzene hexachloride	..	..	ditto
7·5–11·0–2·5 ..	FDL £ s. d. Mixture ..	..	7·5	..	10·25	0·75	..	..	2·5	1·3 magnesia (MgO) as magnesium carbonate	..	..	Fertiliser Distributers Pty. Ltd.
8·0–8·25–8·0 ..	FDL No. 8	..	7·25	0·75	5·0	0·25	3·0	..	8·0	0·9 magnesia (MgO) as magnesium carbonate	85	15	ditto
8·0–8·5–8·0 ..	FDL No. 8 North ..	..	7·25	0·75	4·5	0·25	3·75	..	8·0	4·0 lime (CaO) as calcium carbonate	85	15	ditto
8·0–9·75–8·0 ..	FDL Pyramid with Ferro F.T.E.	..	7·25	0·75	5·75	0·25	3·75	..	8·0	0·175 iron (Fe) 0·063 manganese (Mn) 0·080 copper (Cu) 0·080 zinc (Zn) 0·015 boron (B) 0·003 molybdenum (Mo) as complex silicates	85	15	Fertiliser Distributers Pty. Ltd.
8·0–10·0–8·0 ..	FDL No. 8 BHC North ..	..	7·25	0·75	6·0	0·25	3·75	..	8·0	0·05 gamma isomer of benzene hexachloride	85	15	ditto
	FDL Pyramid North ..	..	7·0	1·0	5·0	..	5·0	..	8·0	1·1 lime (CaO) as calcium carbonate	80	20	ditto
8·0–10·25–8·0 ..	ACF No. 6	..	7·25	0·75	5·5	0·25	4·5	..	8·0	..	90	10	A.C.F. & Shirleys Fertilizers Ltd.
	FDL Pyramid	..	7·25	0·75	6·25	0·25	3·75	..	8·0	..	85	15	Fertiliser Distributers Pty. Ltd.

MIXED FERTILIZERS—*continued.*

Grade Formula.	Name of Preparation.	Guaranteed Analysis.											Queensland Primary Dealer.
		Percentage Nitrogen (N) as			Percentage Phosphoric Acid (P_2O_5) as			Percentage Potash (K_2O) as		Percentage Miscellaneous.	Percentage Fine.	Percentage Coarse.	
		Nitrate of Soda.	Sulphate of Ammonia.	Blood, Bone & Offal.	Water Sol. Super.	Insol. Super.	Bone.	Sulphate.	Chloride.				
8·5–9·0–6·0 ..	WM 8 North	..	7·75	0·75	5·0	0·25	3·75	..	6·0	3·2 lime (CaO) as calcium carbonate	85	15	Walter Milne
9·0–3·0–20·0 ..	FDL Special Volcanic ..	..	8·25	0·75	..	..	3·0	..	20·0	1·1 magnesia (MgO) as magnesium carbonate	85	15	Fertiliser Distributers Pty. Ltd.
	FDL Special Volcanic North	..	8·25	0·75	..	..	3·0	..	20·0	2·8 lime (CaO) as calcium carbonate	85	15	ditto
9·0–6·25–11·0 ..	FDL Howes Mixture ..	..	8·25	0·75	3·0	0·25	3·0	..	11·0	0·9 magnesia (MgO) as magnesium carbonate	85	15	ditto
	FDL Howes Mixture North	..	8·25	0·75	2·5	..	3·75	..	11·0	4·0 lime (CaO) as calcium carbonate	85	15	ditto
	WM Howes North ..	..	8·25	0·75	2·5	..	3·75	..	11·0	4·0 lime (CaO) as calcium carbonate	85	15	Walter Milne
9·0–7·5–11·0 ..	ACF Howe's Muriate ..	..	8·0	1·0	4·0	0·25	3·25	..	11·0	..	85	15	A.C.F. & Shirleys Fertilizers Ltd.
9·0–8·0–11·0 ..	ACF Howe's Muriate Q	..	9·0	..	7·5	0·5	..	..	11·0	..	..	..	ditto
9·0–8·5–7·0 ..	FDL Dynamic	..	9·0	..	8·0	0·5	..	..	7·0	0·5 magnesia (MgO) as magnesium carbonate	..	..	Fertiliser Distributers Pty. Ltd.
	FDL Dynamic North ..	..	9·0	..	8·0	0·5	..	..	7·0	2·0 lime (CaO) as calcium carbonate	..	..	ditto
9·0–9·75–6·0 ..	WM 8 BHC North ..	..	8·25	0·75	5·75	0·25	3·75	..	6·0	0·05 gamma isomer of benzene hexachloride	85	15	Walter Milne
10·0–3·5–20·0 ..	ACF B 7	..	10·0	..	3·25	0·25	..	..	20·0	..	..	..	A.C.F. & Shirleys Fertilizers Ltd.
10·0–4·0–15·0 ..	FDL Superpine	..	10·0	..	3·75	0·25	..	15·0	..	..	..	..	Fertiliser Distributers Pty. Ltd.
10·0–5·0–10·0 ..	ACF Sweetpine Special with Zinc & Copper	..	10·0	..	4·75	0·25	..	10·0	..	0·5 zinc (Zn) as zinc sulphate 0·6 copper (Cu) as copper sulphate	..	..	A.C.F. & Shirleys Fertilizers Ltd.
	FDL Pine Sulphate with Copper & Zinc	..	10·0	..	5·0	..	..	10·0	..	0·5 zinc (Zn) as zinc sulphate 0·6 copper (Cu) as copper sulphate	..	..	Fertiliser Distributers Pty. Ltd.

10·0–5·0–18·0 ..	GF 10 Ratoons	9·0	1·0	1·0	..	4·0	..	18·0	..		90	10	General Fertilisers Ltd.
10·0–5·25–15·0 ..	ACF B 8 Q	10·0	..	5·0	0·25	..	..	15·0	..		..	..	A.C.F. & Shirleys Fertilizers Ltd.
10·0–6·0–10·0 ..	ACF Earli-Pine Special with Zinc & Copper ..	10·0	..	5·75	0·25	..	..	10·0	0·5 0·6	zinc (Zn) as zinc sulphate copper (Cu) as copper sulphate	..	..	ditto
	ACF Sweetpine	10·0	..	6·0	..	..	10·0	..	..		..	..	ditto
	FDL Pine Muriate with Copper & Zinc ..	10·0	..	6·0	..	..	..	10·0	0·5 0·6	zinc (Zn) as zinc sulphate copper (Cu) as copper sulphate	..	..	Fertiliser Distributers Pty. Ltd.
	FDL Pine Sulphate	10·0	..	6·0	..	..	10·0	..	..		..	..	ditto
	FDL Pine Sulphate North ..	10·0	..	6·0	..	..	10·0	..	..		..	..	ditto
	GF Muri-Pine Containing Copper & Zinc Sulphates ..	10·0	..	6·0	..	..	..	10·0	0·5 0·6	zinc (Zn) as zinc sulphate copper (Cu) as copper sulphate	..	..	General Fertilisers Ltd.
	GF Sulpha-Pine	10·0	..	6·0	..	..	10·0	..	..		..	..	ditto
10·0–6·5–10·0 ..	ACF Earlipine	10·0	..	6·5	..	..	..	10·0	..		..	..	A.C.F. & Shirleys Fertilizers Ltd.
	FDL Pine Muriate	10·0	..	6·5	..	..	..	10·0	..		..	..	Fertiliser Distributers Pty. Ltd.
10·0–7·0–5·0 ..	FDL BKN No. 1 North ..	9·5	0·5	4·5	0·25	2·5	..	5·0	4·2 0·9	lime (CaO) as calcium carbomate magnesia (MgO) as magnesium carbonate	85	15	ditto
10·0–7·25–5·0 ..	FDL BKN No. 1	9·25	0·75	4·0	0·25	3·0	..	5·0			85	15	ditto
10·0–7·5–7·0 ..	FDL Atomic Special	9·25	0·75	4·25	0·25	3·0	..	7·0	0·3	magnesia (MgO) as magnesium carbonate	85	15	Fertiliser Distributers Pty. Ltd.
10·0–8·25–7·5 ..	Shirleys Tropic	10·0	..	7·75	0·5	..	..	7·5	..		..	..	A.C.F. & Shirleys Fertilizers Ltd.
	Richards Tropic	10·0	..	7·75	0·5	..	..	7·5	..		..	..	H. J. Richards & Sons
10·0–8·5–5·0 ..	ACF B 2	9·0	1·0	5·0	0·25	3·25	..	5·0	..		85	15	A.C.F. & Shirleys Fertilizers Ltd.
10·0–9·0–5·0 ..	ACF B 2 Q	10·0	..	8·5	0·5	..	..	5·0	..		..	..	ditto
	ACF B 2 Q (Gam. 50)	10·0	..	8·5	0·5	..	..	5·0	0·06	gamma isomer of benzene hexachloride	..	..	ditto
10·0–9·0–8·0 ..	GF 9	8·5	1·5	2·0	..	7·0	..	8·0	..		90	10	General Fertilisers Ltd.
10·0–10·0–2·5 ..	ACF B 9 Q	10·0	..	9·5	0·5	..	..	2·5	..		..	..	A.C.F. & Shirleys Fertilizers Ltd.
10·0–10·75–0 ..	FDL No. 12	10·0	..	10·0	0·75	..	..	..	0·25	magnesia (MgO) as magnesium carbonate	..	..	Fertiliser Distributers Pty. Ltd.
10·25–10·75–0 ..	Shirleys No. 10	10·25	..	10·25	0·5	..	..	..	..		..	..	A.C.F. & Shirleys Fertilizers Ltd.
10·5–6·5–10·0 ..	GF Muri-Pine	10·5	..	6·5	..	..	..	10·0	..		..	..	General Fertilisers Ltd.
10·5–7·5–4·0 ..	FDL Atomic North	9·5	1·0	3·0	..	4·5	..	4·0	2·8	lime (CaO) as calcium carbonate	85	15	Fertilizer Distributers Pty. Ltd.
10·5–7·75–4·0 ..	FDL Atomic	9·75	0·75	4·5	0·25	3·0	..	4·0	0·5	magnesia (MgO) as magnesium carbonate	85	15	ditto

MIXED FERTILIZERS—*continued.*

Grade Formula.	Name of Preparation.	Guaranteed Analysis.											Queensland Primary Dealer.
		Percentage Nitrogen (N) as			Percentage Phosphoric Acid (P_2O_5) as			Percentage Potash (K_2O) as		Percentage Miscellaneous.	Percentage Fine.	Percentage Coarse.	
		Nitrate of Soda.	Sulphate of Ammonia.	Blood, Bone & Offal.	Water Sol. Super.	Insol. Super.	Bone.	Sulphate.	Chloride.				
10·75–5·0–15·0 ..	FDL Trinity North ..	..	10·25	0·5	2·5	..	2·5	..	15·0	..	85	15	Fertiliser Distributers Pty Ltd.
11·0–4·5–15·0 ..	FDL Trinity Mixture ..	..	10·25	0·75	0·75	..	3·75	..	15·0	..	85	15	ditto
11·0–7·25–5·0 ..	WM 7 North	..	10·25	0·75	3·25	0·25	3·75	..	5·0	2·6 lime (CaO) as calcium carbonate	85	15	Walter Milne
12·5–5·5–7·5 ..	ACF B 6 Q	..	12·5	..	5·25	0·25	..	..	7·5	..	..	..	A.C.F. & Shirleys Fertilizers Ltd.
13·0–4·5–7·0 ..	FDL Pinnacle	..	12·5	0·5	2·5	..	2·0	..	7·0	0·1 magnesia (MgO) as magnesium carbonate	90	10	Fertiliser Distributers Pty Ltd.
	FDL Pinnacle North ..	..	12·25	0·75	0·75	..	3·75	..	7·0	2·2 lime (CaO) as calcium carbonate	85	15	ditto
13·5–5·0–2·5 ..	FDL BKN No. 3 North	..	13·0	0·5	2·5	..	2·5	..	2·5	2·9 lime (CaO) as calcium carbonate	90	10	ditto
13·5–5·5–2·5 ..	FDL BKN No. 3 ..	..	13·0	0·5	3·0	0·25	2·0	..	2·5	0·5 magnesia (MgO) as magnesium carbonate	90	10	ditto
14·0–5·5–3·75 ..	WM 9	..	13·25	0·75	2·0	..	3·5	..	3·75	..	85	15	Walter Milne
14·0–6·0–3·75 ..	WM 9 North	..	13·5	0·5	3·25	0·25	2·5	..	3·75	..	85	15	ditto
14·0–7·0–3·0 ..	GF 8	..	13·0	1·0	2·0	..	5·0	..	3·0	..	90	10	General Fertilisers Ltd.
15·0–4·25–2·5 ..	ACF B 5	..	14·0	1·0	1·0	..	3·25	..	2·5	..	85	15	A.C.F. & Shirleys Fertilizers Ltd.
15·0–4·5–2·5 ..	ACF B 5 Q (Gam. 50) ..	..	15·0	..	4·25	0·25	..	..	2·5	0·06 gamma isomer of benzene hexachloride	..	..	ditto
15·0–4·75–2·5 ..	ACF B 5 Q	..	15·0	..	4·5	0·25	..	..	2·5	..	..	..	ditto

MISCELLANEOUS FERTILIZERS.

Name of Preparation.	Guaranteed Analysis				Queensland Primary Dealer.
	Percentage Nitrogen (N).	Percentage Phosphoric Acid (P_2O_5).	Percentage Potash (K_2O).	Miscellaneous.	
Gard-N-Tabs.. ..	7·0 as potassium nitrate .. 7·0 as diammonium phosphate	19·0 water sol. as diammonium phosphate	24·0 as potassium nitrate	..	Fertiliser Distributers Pty. Ltd.
Ferto Tablets ..	10·0 as sulphate of ammonia	4·0 as superphosphate ..	11·0 as muriate of potash 4·0 as sulphate of potash	..	Ferto Products Co.
Humus Concentrate Planting Mixture	1·5 as sulphate of ammonia	8·0 as superphosphate ..	2·75 as muriate of potash	13·5% lime (CaO) as calcium carbonate 15·0% humus as composted animal excreta and vegetable matter 2·0% sand 50·0% fine ; 50·0% coarse	Jas. H. Harris
Humus Concentrate Planting Mixture plus BHC	1·5 as sulphate of ammonia	8·0 as superphosphate ..	2·75 as muriate of potash	13·5% lime (CaO) as calcium carbonate 0·066% gamma isomer of benzene hexachloride 15·0% humus as composted animal excreta and vegetable matter 2·0% sand 50·0% fine ; 50·0% coarse	ditto
Humus Concentrate Ratooning Mixture	3·75 as sulphate of ammonia	5·75 as superphosphate ..	5·75 as muriate of potash	14·0% lime (CaO) as calcium carbonate 12·5% humus as composted animal excreta and vegetable matter 1·5% sand 50·0% fine ; 50·0% coarse	ditto
Aquasol Liquid Manure	18·0 as urea .. .. 2·0 as mono-ammonium phosphate	12·0 as mono-ammonium phosphate	16·0 as potassium sulphate	6·0% sulphur (S) as sulphates .. .. 1·0% lime (CaO) as calcium sulphate .. 0·3% magnesia (MgO) as magnesium sulphate 1,500 ppm manganese (Mn) as manganese sulphate 625 ppm iron (Fe) as sodium ferric E.D.T.A. 600 ppm copper (Cu) as copper sulphate 525 ppm zinc (Zn) as zinc sulphate .. .. 120 ppm boron (B) as sodium borate 15 ppm molybdenum (Mo) as sodium molybdate	International Traders Pty. Ltd.

MISCELLANEOUS FERTILIZERS—*continued.*

Name of Preparation.	Guaranteed Analysis				Queensland Primary Dealer.
	Percentage Nitrogen (N).	Percentage Phosphoric Acid (P_2O_5).	Percentage Potash (K_2O).	Miscellaneous.	
Fert-Element Tablets	7·0 as potassium nitrate .. 7·0 as diammonium phosphate	19·0 water sol. as diammonium phosphate	24·0 as potassium nitrate	2,000 ppm iron (Fe) as ferrous sulphate 500 ppm boron (B) as sodium perborate 210 ppm lime (CaO) as calcium hydroxide 200 ppm copper (Cu) as copper sulphate 160 ppm magnesia (MgO) as magnesium sulphate 120 ppm zinc (Zn) as zinc sulphate 100 ppm molybdenum (Mo) as sodium molybdate 35 ppm manganese (Mn) as manganese sulphate	International Traders Pty. Ltd.
Lane's Liquid Fertiliser	5·58 as urea .. .. 3·02 as diammonium phosphate	8·6 as diammonium phosphate	4·0 as sulphate of potash	0·4% iron (Fe) as ferrous sulphate 0·25% manganese (Mn) as manganese sulphate 0·25% copper (Cu) as copper sulphate 0·20% magnesium (Mg) as magnesium sulphate 0·12% zinc (Zn) as zinc sulphate 0·007% molybdenum (Mo) as sodium molybdate 0·057% boron (B) as sodium tetraborate 0·065% naphthylacetamide as sodium salt 53·37% water	Lane's Pty. Limited
Nitrophoska BASF Blue	10·3 as ammonium nitrate 1·7 as mono-diammonium phosphate	4·7 water sol. as mono-diammonium phosphate 7·3 citrate sol. as dicalcium phosphate	19·0 as sulphate of potash	..	Henry H. York Co.
Nitrophoska BASF Red	11·2 as ammonium nitrate 1·8 as mono-diammonium phosphate	5·2 water sol. as mono-diammonium phosphate 7·8 citrate sol. as dicalcium phosphate	20·0 as potassium chloride	..	ditto
Summit Growth Fertilizer Tablets	4·1 as potassium nitrate ..	7·0 water sol. as superphosphate	12·2 as potassium nitrate	0·3% manganese (Mn) as manganese sulphate 0·2% magnesium (Mg) as magnesium sulphate 0·3% copper (Cu) as copper sulphate 0·5% stearic acid	T. H. Wood Pty. Ltd.

TRACE ELEMENTS.

Name of Preparation.	Guaranteed Analysis as Percentage.	Queensland Primary Dealer.
Borax	11·3 boron (B) as borax	A.C.F. & Shirleys Fertilizers Ltd.
Sulphate of Iron	19·7 iron (Fe) as iron sulphate	ditto.
Ammonium Molybdate	48·0 molybdenum (Mo) as ammonium molybdate	ditto
Sodium Molybdate	39·0 molybdenum (Mo) as sodium molybdate	ditto
C. O. D. Molybdate	33·0 molybdenum (Mo) as sodium molybdate	The Committee of Direction of Fruit Marketing
FDL Molybdate	38·0 molybdenum (Mo) as sodium molybdate	Fertiliser Distributers Pty. Ltd.
ACF Powdered Sulphur	99·0 sulphur (S)	A.C.F. & Shirleys Fertilizers Ltd.
Zinc Sulphate	22·7 zinc (Zn) as zinc sulphate	ditto
Zinc Sulphate	22·25 zinc (Zn) as zinc sulphate	A. Victor Leggo & Co. Pty. Ltd.
Aerflo S.M.B. 230	0·96 molybdenum (Mo) as sodium molybdate 3·85 boron (B) as borax 57·00 kaolin	Aerflo Dusts & Sprays Pty.
FDL Borax–Molybdate Mixture	4·0 boron (B) as borax 1·0 molybdenum (Mo) as sodium molybdate 62·4 kaolin	Fertiliser Distributers Pty. Ltd.
Phytona Trace Element Mixture	8·2 magnesia (MgO) as magnesium sulphate 6·5 manganese (Mn) as manganese sulphate 4·3 zinc (Zn) as zinc sulphate 3·9 copper (Cu) as copper sulphate 1·2 boron (B) as borax 0·4 molybdenum (Mo) as sodium molybdate	Houghton & Byrne (Q.) Pty. Ltd.
FTE Ferro Fritted Trace Elements	7·0 iron (Fe) 2·52 manganese (Mn) 3·2 zinc (Zn) 3·2 copper (Cu) } as complex silicates 0·62 boron (B) 0·13 molybdenum (Mo)	H. W. Smith, Rep. Armco (Aust.) Pty. Ltd.

SOIL TESTING KIT.

Hortico Soil Testing Kit	For testing for mineral deficiencies by trial plots	International Traders Pty. Ltd.

(CONCLUDED.)

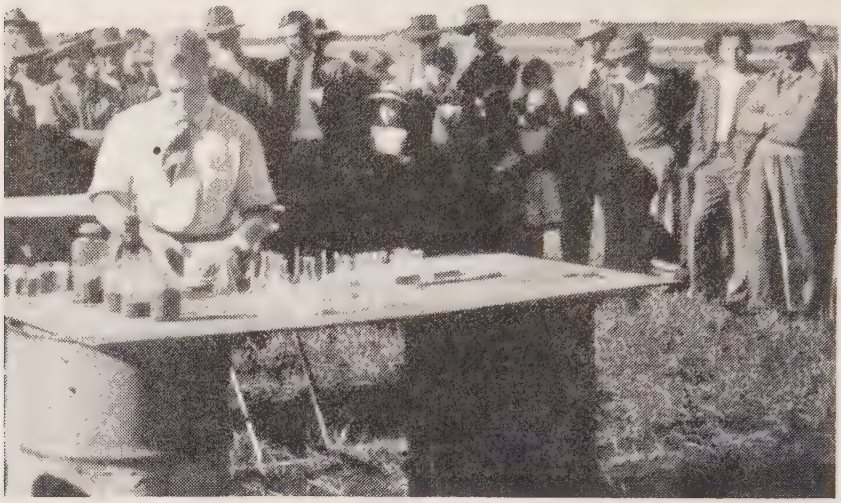


Plate 1.

At a Field Day, Estimation of Available Soil Nitrogen Is Carried Out by a Student.

Careers For Country Boys And Girls

No. 2—Agricultural Science

By E. T. HOCKINGS, Editor of Publications.

To have a good education and to be able to earn their living in close contact with the open air, animals, plants, and soils must surely be the ambition of many Queensland boys and girls.

Many have a natural inclination to "go on the land." In some instances it may be easy for them to do so; their fathers may be able to settle them comfortably on properties, particularly if their fathers are farmers or graziers.

For the others there may be no ready-made niches. They either have to go on the land the hard way or find some other outlet for their land hunger.

But there is a path, down which intelligent youth may walk, that leads to a satisfying livelihood close to the soil. This is the avenue of Agricultural Science. And it shows the way to a door through which pass men and women whose work is changing the face of Australia.

THE WORK.

Agricultural science is a university course that equips young people to take up careers in any of the following capacities*:

AGRICULTURAL CHEMIST.

He provides basic information in many research projects and in other aspects of agricultural science serving the man on the land. Soil science, plant physiology, composition of agricultural products, control of weeds, pests and diseases, and many other fields are being rapidly developed because of the evolution of new chemical and physical methods.

AGRICULTURAL ENGINEER.

He speeds up farm mechanization, designs better farm buildings and equipment, and plans more efficient irrigation and water control systems.

AGROSTOLOGIST.

Better pastures based on the work of the agrostologist (or grassland specialist) are increasing livestock production on millions of acres throughout Australia, and increasing soil fertility.

AGRONOMIST.

He is a crop specialist whose work is cultivating and managing the land to improve yield and quality of crops such as wheat, rice, oats, lucerne, linseed, and many more. He must find the right variety for any situation, the soil treatment it requires, its protection against weeds, pests, and diseases.

BACTERIOLOGIST.

He plays an important part in many branches of agriculture—for example, in soil science, plant pathology, food processing, and animal husbandry, and in developing techniques to ensure an hygienic food supply.

ENTOMOLOGIST.

Many methods of control are used to combat insect pests. Entomologists study the life histories and habits of pests, screen insecticides, and devise methods of control based on either the application of chemicals, or cultural practices.

PLANT PATHOLOGIST.

The fight against plant disease is waged in laboratory and field. New varieties are being bred for disease resistance, and better chemical sprays are defeating many old scourges.

FOOD TECHNOLOGIST.

He carries out work leading to the better use of agricultural products for development of many food and chemical industries.

IRRIGATIONIST.

He studies the effective use of water, how it can meet crop requirements without waste, and how to prevent waterlogging which can damage both crops and land.

LAND RESOURCES SURVEYOR.

Agricultural scientists form part of resources survey teams studying vegetation, geology, and agricultural resources of northern Australia and New Guinea.

PLANT BREEDER.

He combines the qualities of varieties and strains to give us higher yielding plants—from grasses to fruit trees—better adapted to our soils and climates, more resistant to drought and disease.

PLANT EXPLORER.

He collects new plants which are introduced into Australia for testing.

SOIL CONSERVATIONIST.

As well as advising direct methods of erosion control, he must ensure the safe development of many millions of acres by defining correct land use and balanced systems of farming.

---

* *These brief descriptions are taken from the authoritative brochure issued by the Australian Institute of Agricultural Science.*

SOIL SCIENTIST.

He studies and maps soils, determining their chemical and physical properties as a basis for sound agricultural development.

THE TRAINING.

The "Handbook of the Faculty of Agriculture" tells us that the four-year course at the University of Queensland is founded on the botanical and chemical sciences. These are recognised as fundamental to most phases of agricultural science and are the basis for the study of soil science, entomology, plant pathology, plant breeding, nutrition, and so on.

The main training in the application of science to agricultural practice is afforded at the Gatton Agricultural College and, in addition, students are required to obtain further practical experience on farms and at agricultural institutions during the summer vacations.

Full details of the course are available in the faculty handbook, obtainable at the University.

FORESTRY COURSE.

It might be as well to note here that the administration of the course in Forestry was transferred from the Faculty of Science to the Faculty of Agriculture in 1948. The forestry course now comprises two years at the University, where the science fundamentals are studied, followed by two years at Canberra. Practical experience during vacations is a requirement. Successful candidates

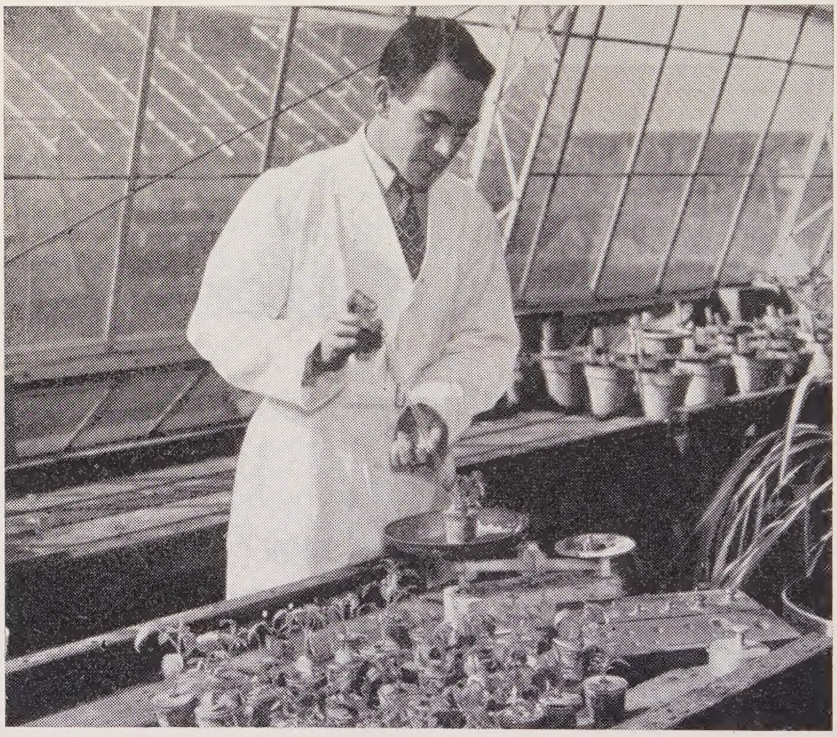


Plate 2.

Agricultural Science Student Determines the Wilting Point of Soil from Western Queensland.

receive the diploma from the Australian Forestry School and the degree from the University.

Details of the part of the course conducted at the University will be found in the faculty handbook.

Cost of the course in agricultural science at the University is £296 10s. This includes graduation fee of £7. In addition the cost of two terms in third year at Gatton Agricultural College is £103. This makes the total cost of the course £399 10s.

The Department of Agriculture and Stock awards a limited number of scholarships and/or cadetships both for undergraduate and post-graduate training. Also there is a scholarship awarded by the Queensland Dairymen's Organisation, one by the South Queensland Tobacco Growers' Co-operative Association Ltd., and two by the Australian Agricultural Council.

The value of each Agricultural Council scholarship for 1958 will be a living allowance, without a means test, of £286 a year, increasing by an annual increment of £25 in each subsequent year of the course. An additional allowance of £104 a year will be paid to scholarship holders who are required to live away from home. Compulsory fees and travelling allowance will be paid under the Commonwealth Scholarship award.

Holders of scholarships will not enter into a bond but during long vacations will, as a condition of continuation of the scholarship, undertake employment with the Department of Agriculture or other approved departments or on approved farms.

Commonwealth scholarships, totalling 400, are awarded each year to enable students to undertake a university course. The scholarships cover tuition fees and certain other compulsory expenses. Living allowances may be applied for but are subject to a means test. The maximum living allowance is £195 a year for a student living at home, and £299 if living away from home. Inquiries should be directed to the Officer-in-Charge, Commonwealth Scholarship Scheme, Block A, Technical College Buildings, George Street, Brisbane. Winners of State scholarships may hold Commonwealth scholarships as well.

At the University there are a number of scholarships and prizes. The Robert Philp Scholarship and the Edwin Munro Scholarship are offered annually to students in agricultural science intending to undertake post-graduate studies leading to Honours. The awards are for the student showing greatest general proficiency in agriculture throughout the course. These scholarships may be, and usually are, held in conjunction. Their combined value is about £240.

The Slade Scholarship is open to students who have completed the requirements for entry upon the fourth year of the course for the degree of Bachelor of Agricultural Science. The award is based upon the record of candidates throughout the course. Its value is about £40.

The Ivor A. Gill Memorial Scholarship is available to undergraduates and graduate students who are engaged in studies calculated to lead to an increase in the productivity of the land of Australia and particularly in the production of wool. It is tenable for one year and is valued at approximately £100.

The William Woolcock Memorial Prize is awarded annually to the student completing the fourth year of the course who is most proficient in the subject of agricultural chemistry.

THE SALARY.

Commencing salaries of male graduates in agricultural science in various professional categories in the Department of Agriculture and Stock are in the region of £1,200 a year, inclusive of "cost of living" adjustment. This salary advances by annual increments, and after 8 years of training

and experience a salary approximating £1,570 would be attained.

Graduates would then be eligible for promotion to more senior appointments, with salaries ranging up to £1,860 and beyond. (These salaries are reviewed from time to time.)

Permanent employment in the State Public Service also provides for superannuation on retirement.

"LARGE AND URGENT NEED."

The Dean of the Faculty of Agriculture at the University of Queensland, Professor L. J. H. Teakle, looks to the future of agricultural science with confidence.

"When a stranger hears of the great potential for rural development in Queensland," he says, "he must often wonder why more has not been achieved in the last century. The answer is that much has been achieved by development in a difficult country. It must be remembered, too, that much of Queensland lies within the tropics and presents a challenge which we are confident can be met.

"The great advances in agricultural science and the growing population in Australia now open up further avenues for development, and, over much of Queensland, a change from pioneering to more balanced rural industries. The attainment of this recognised potential of Queensland is dependent on three things: hard work, capital, and agricultural science. Without either one, development will be very slow.

"There is a large and urgent need for many more agricultural scientists to join with farmers and graziers in determining new methods and applying them for rural development in Queensland and in attracting investment for economical working. There is scope for the best of our youth to enter agricultural science and play their part in attaining the potential for rural development in Queensland."

WINTER GRAZING CROPS.

Winter grazing crops could well be the mainstay of the dairy industry this winter, especially on milk supply farms. Mr. O. L. Hassell, Senior Adviser in Agriculture, says that the below-average wheat harvest last year and the recent greatly reduced sorghum plantings will make cereal concentrates scarce this winter. The counter to this is to increase your plantings of winter grazing crops. In Queensland, there are at least five crops to choose from.

Oats is the State's most popular winter grazing crop, but due to last year's drought, seed is in very short supply. You may not be able to get the rust-resistant Bovah and Benton varieties and you may have to fall back on Belar, Algerian, Mulga or Acacia.

If you can't get any oat seed, satisfactory alternatives are wheat and barley. A mixture with field peas is suggested. In mixtures, 20 lb. of field peas to the acre are sufficient when sown with 40 lb. of wheat or barley. Kale and rape are also good winter crops, but there is a risk of severe aphid damage in mild winters. Kale, which is very drought-resistant once it has outgrown the seedling stage, is planted at 1½ to 2 lb. to the acre. It is ready to use in about four months. Rape is ready for grazing in 10 to 12 weeks and will stand successive grazings by cattle. The sowing rate is 4 to 8 lb. an acre.

It's best to sow winter grazing crops early—about the last week in March. This will give you early forage and allow the crop to produce the greatest number of grazings. If you prepare your land early, you'll be able to make the fullest use of stored moisture from summer rains. The area you should sow to ensure continued grazing depends on how well the crop grows and the size of your herd. However, you can safely budget on an area equal in acres to one-third or one-half the number of cows you are feeding. That is, if you plan to graze 36 cows, you'll need from 12 to 18 acres of crops.